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FRONTIER REFINING - CHEYENNE REFINERY (H)
CONSENT DECREE, SEMI-ANNUAL RPTS F3, AFS
Folder #: 104717

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Return Receipt Requested**

August 29, 2014

**Chief
Environmental Enforcement Section
Environment and Natural Resources Division
U.S. Department of Justice
P.O. Box 7611, Ben Franklin Station
Washington, D.C. 20044-7611**

**Director, Air Enforcement Division
Office of Civil Enforcement
U.S. Environmental Protection Agency
Mail Code 2242-A
1200 Pennsylvania Avenue, N.W.
Washington, D.C. 20460-0001**

**Chief
Mail Code 8 ENF-T
Office of Enforcement, Compliance, and
Environmental Justice
U.S. EPA Region 8
1595 Wynkoop St.
Denver, CO 80202-1129**

**Wyoming Department of Environmental
Quality
Air Quality Division
Herschler Building
122 W. 25th Street
Cheyenne, WY 82002**

**RE: Frontier Refining LLC, Cheyenne Refinery
NPRI Consent Decree dated March 26, 2009
DOJ Case No. 90-5-2-1-08660
Civil Case No. 09-CV-1032-WEB-KMH
Submittal of Semi-annual Progress Report: January 1, 2014 through
June 30, 2014**

To Whom It May Concern:

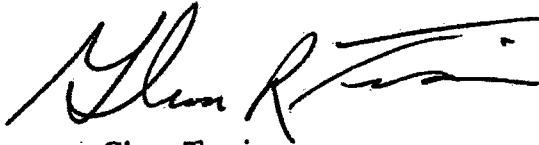
Pursuant to Section XI of the referenced Consent Decree, Frontier Refining LLC is hereby submitting the semi-annual progress report for January 1, 2014 through June 30, 2014 (see attached).

I certify under penalty of law that this information was prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my directions and my inquiry of the person(s) who manage the system, or the person(s) directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete.

**Frontier Refining LLC
P.O. Box 1588 • Cheyenne, WY 82003-1588
(307) 634-3551 • Fax (307) 771-8794
<http://www.hollyfrontier.com>**

Please contact me at (307) 771-8706 if you have any questions.

Sincerely,

A handwritten signature in black ink, appearing to read "Glenn Travis", with a stylized flourish at the end.

Glenn Travis
Environmental Manager
Frontier Refining LLC

Attachments

cc: Director, Air Enforcement Division
Office of Civil Enforcement
U.S. Environmental Protection Agency
c/o Matrix New World Engineering, Inc.
26 Columbia TPKE STE 200
Florham Park, NJ 07932-2213

Electronic copy to
csullivan@matrixnewworld.com
foley.patrick@epa.gov

Frontier Refining LLC
P.O. Box 1588 • Cheyenne, WY 82003-1588
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Introduction

In accordance with the requirements of Section XI of the NPRI Consent Decree dated March 26, 2009, Frontier Refining LLC (FR) is submitting the following "semi-annual report". This progress report lists the status of requirements with a completion deadline of June 30, 2014 or earlier. This report covers the time period from January 1, 2014 through June 30, 2014. A Report Cross Reference Table (Table 1) is provided to aid in the review process. Any attachments that are required to be submitted with this semi-annual report are provided behind the respective section.

Table 1
Report Cross Reference

| Paragraph | Requirements | Comments | Attachment |
|-----------|--|---|------------------------------|
| 216 | FRI and FEDRC shall submit to EPA and the Applicable Intervenor, semi-annual reports due on August 31st (covering the prior period from January 1st to June 30th) and February 28th (covering the prior period from July 1st to December 31st), with the first such report due on August 31, 2009. The semi-annual reports shall contain the following information for each relevant Covered Refinery: | | See below |
| 216a | For the period covered by the report, a summary of the emissions data for the Covered Refinery that is specifically required by the reporting requirements of the Consent Decree; | Emissions reported per Paragraph 217 below | See below |
| 216b | A description of any problems anticipated with respect to meeting the requirements of this Consent Decree at each Covered Refinery; | There are no problems anticipated. Some information on future plans is included in the summary of additional requirements. | H |
| 216c | A description of all Supplemental Environmental Projects and Implementation activity in accordance with this Consent Decree; | SEPs are all completed. | F |
| 216d | Any such additional matters as FRI or FEDRC believes should be brought to the attention of the Applicable Federal and State Agencies; | See summary of additional requirements. | H |
| 216e | Any additional items required by any other Paragraph of this Consent Decree to be submitted with a semi-annual report including but not limited to reports required under Paragraphs 137, 152, 170, and 205. | | 137: A, 150 & 172: E, 205: F |
| 217 | In the semi-annual report required to be submitted on August 31st of each year, FRI and FEDRC shall provide a summary of annual emissions data for each Covered Refinery for the prior calendar year, to include: | | See below |
| 217a | NOx emissions in tons per year for each heater and boiler greater than 40 mmBTU/hr maximum fired duty; | | D |
| 217b | NOx emissions in tons per year as a sum for all heaters and boilers less than 40 mmBTU/hr maximum fired duty; | | D |
| 217c | SO ₂ , CO and PM emissions in tons per year as a sum for all heaters and boilers; | | D |
| 217d | SO ₂ emissions from all Sulfur Recovery Plants in tons per year; | | G |
| 217e | SO ₂ emissions from all Acid Gas Flaring and Tail Gas Incidents by flare in tons per year; | | C |
| 217f | NOx, SO ₂ , PM and CO emissions in tons per year as a sum at each Covered Refinery for all other emissions units for which emissions information is required to be included in the facilities' annual emissions summaries and that are not identified above; | | H |
| 217g | SO ₂ , NOx, CO and PM emissions in tons per year for each FCCU, | | B |
| 217h | for each of the estimates or calculations in Subparagraphs 217.a. through 217.g. above, the basis for the emissions estimate or calculation (i.e. stack tests, CEMS, emission factor, etc.). | Included with each emission summary table. | N/A |
| 217 | To the extent that the required emissions summary data is available in other reports generated by FRI and/or FEDRC, as appropriate, such other reports can be attached or the appropriate information can be extracted from such other reports and attached to the semi-annual report to satisfy the requirement. | All of the necessary information is included in this report unless noted otherwise. | N/A |
| 218 | In each semi-annual report required under Paragraph 216 for each Covered Refinery, FRI and FEDRC shall provide a summary of all exceedances of emission limits required or established by this Consent Decree, which shall include: | | See below |
| 218a | for operating units emissions limits that are required by this Consent Decree and monitored with CEMS, for each CEMS: | CEM monitoring data is contained in each applicable section. | FCCU: B, Heaters: D, SRP: G |
| 218b | for any exceedance of an emissions limit required by this Consent Decree from an operating unit monitored through stack testing: | No exceedances of an emission limit from an operating unit monitored through stack testing occurred in this reporting period. | N/A |
| 219 | Each Covered Refinery's semi-annual report shall be certified by either the person responsible for environmental management and compliance for that Covered Refinery, or by a person responsible for overseeing implementation of this Consent Decree. The certification shall state: I certify under penalty of law that this information was prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my directions and my inquiry of the person(s) who manage the system, or the person(s) directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. | Certification contained on the cover letter. | Cover Letter |

Section A – BWON

Certificates

Quarterly Sampling

1st & 2nd Quarter Reports

Frontier Refining LLC
P.O. Box 1588 • Cheyenne, WY 82003-1588

Report Period January 1 – July 31, 2014

| Paragraph | Attachment A - BWON | Comments |
|-----------|---|--|
| 137 | Record Keeping and Reporting Requirements for this Section VI.L: As part of either the reports required under 40 C.F.R. § 61.357 or the progress report procedures of Part IX of this Consent Decree (Record Keeping and Reporting), for their respective Covered Refinery, FRI and FEDRC shall submit the following information as part of the quarterly report required pursuant to 40 C.F.R. § 61.357(d)(6) and (7) ("Section 61.357 Reports") (for FEDRC) or in the reports due pursuant to Paragraph 216 of this Decree: | The information is reported as described below. |
| 137a | Sampling Results under Paragraphs 123, 124, and 125. The report shall include a list of all waste streams sampled, the results of the benzene analysis for each sample, and the computation of the quarterly and projected calendar year TAB (for the FRI Refinery) and the quarterly and projected calendar year uncontrolled benzene quantity (for the FEDRC Refinery); | This information is included in the reports under §61.357, which are also included in this section. Because Frontier has been determined to be >10 Mg/yr facility, the report includes the uncontrolled benzene quantity as opposed to the TAB. |
| 123 | The Sampling Plan shall commit FRI and/or FEDRC, as appropriate, to analyze, in each calendar quarter at least three representative samples from all waste streams identified in Paragraph 122.a and all locations identified in Paragraph 122.b. | Results from this sampling is included in the quarterly reports. |
| 124 | For Covered Refineries with a TAB greater than or equal to 10 Mg/yr, the Sampling Plans shall identify: | See below for sampling results details. As part of the recent audit and work following, Frontier has done a thorough review of the BWON Sampling Plan and is in the process of determining how the plan needs to be updated. After it is determined how to update the plan to properly reflect operations, it will be submitted and implemented. when? |
| 124a | each uncontrolled waste stream that contains greater than 0.05 Mg/yr of benzene at the point of generation; | Results from this sampling is included in the quarterly reports. |
| 124c | the proposed End-of-Line sampling locations and methods for flow calculations to be used in calculating projected quarterly and annual uncontrolled benzene quantity calculations under the terms of Paragraph 129. | Results from EOL sampling is included in the quarterly reports. |
| 125 | The Sampling Plan required under Paragraph 124 shall commit FRI and/or FEDRC, as appropriate, to analyze, in each calendar quarter, at least three representative samples from all waste streams identified in Subparagraphs 124.a and 124.b and all locations identified in Subparagraph 124.c. | Results from this sampling is included in the quarterly reports. |
| 137b | Training. Initial and/or subsequent training conducted by FRI and FEDRC in accordance with Paragraphs 115 - 117; | See below |

| Paragraph | Attachment A - BWON | Comments |
|-----------|--|---|
| 115 | Benzene Waste Sample Training. By the later of the Date of Entry or March 31, 2009, FRI and FEDRC shall develop and begin annual (i.e., once each calendar year) training for all employees asked to draw BWON samples at either of the Covered Refineries. | Training completed as required. Training records are attached. |
| 116 | Standard Operating Procedures for BWON Equipment. By the later of the Date of Entry or March 31, 2009, FEDRC shall complete the development of standard operating procedures for all control equipment used to comply with the BWON at the Covered Refinery. | Frontier recently voluntarily disclosed audit findings that identified these procedures and training were deficient. Frontier is in the process of correcting those deficiencies. |
| 116a | On or before June 1, 2009, FEDRC shall complete an initial training program regarding these procedures for all operators assigned to this equipment. FEDRC shall provide comparable training to any persons who subsequently become operators, prior to their assumption of this duty. Until termination of this Decree, "refresher" training in these procedures shall be performed at a minimum on a three (3) year cycle. | Not Applicable |
| 116b | The FRI Refinery shall comply with the provisions of Paragraph 116 if and when its TAB reaches 10 Mg/yr. FRI shall propose a schedule for training at the same time that FRI proposes a plan, pursuant to Paragraph 94, that identifies the compliance strategy and schedule that FRI shall implement to maintain compliance with the waste benzene NESHAP. | Frontier recently voluntarily disclosed audit findings that identified these procedures and training were deficient. Frontier is in the process of correcting those deficiencies. |
| 117 | Training: Contractors. As part of their training program, FRI and FEDRC must ensure that the employees of any contractors hired to perform the requirements of Paragraphs 115 and 116 are properly trained to implement all applicable provisions of this Section VI.L. | Frontier recently voluntarily disclosed audit findings that identified these procedures and training were deficient. Training was completed as required. Training records are attached. |
| 137c | Laboratory Audits. Initial and subsequent audits conducted by FRI and FEDRC pursuant to Paragraphs 110 - 113, through the calendar quarter for which the quarterly report is due, including in each such report, at a minimum, the identification of each laboratory audited, a description of the methods used in the audit, and the results of the audit. | See below |
| 110 | Laboratory Audits. FRI and FEDRC shall conduct audits as required by Paragraphs 111 - 112, below, of all laboratories that perform analyses of their respective BWON samples to ensure that proper analytical and quality assurance/quality control procedures are followed. | BWON lab audits were conducted on 8/13/2013 and 8/17/2013. Results of both audits are attached. A subsequent audit is required at least once every two years. |
| 111 | Within one year from the Date of Entry, FRI and FEDRC shall complete audits of all of the laboratories they each use to perform analyses of BWON samples. Thereafter, FRI and FEDRC shall audit any new laboratory to be used for analyses of BWON samples prior to such use. | Completed previously. |

| Paragraph | Attachment A - BWON | Comments |
|-----------|--|--|
| 112 | Until this Consent Decree is terminated, FRI and FEDRC shall conduct subsequent audits of each of their respective laboratories used for BWON analyses at least once every two years. | BWON lab audits were conducted on 8/13/2013 and 8/17/2013 . Results of both audits are attached. A subsequent audit is required at least once every two years. |
| 113 | FRI and FEDRC may retain third parties to conduct these audits or use audits conducted by others, but it is the sole responsibility and obligation of FRI and FEDRC to ensure that the Covered Refineries comply with this Consent Decree and Subpart FF. | Frontier utilizes a third party to conduct the audits. |
| 130 | In making the calculations required under Paragraph 129, FRI and FEDRC shall use the average of the three (3) samples collected at each sampling location. If these calculations do not identify any potential violations of the BWON, FRI and FEDRC shall submit these calculations in the reports due under Section XI. (Reporting and Record Keeping) of this Decree. | The calculations are submitted in the required reports and included in the quarterly reports. |

**2014 Q2 UNCONTROLLED QUANTITY BASED ON QUARTERLY END OF LINE CONSENT DECREE SAMPLING RESULTS
FRONTIER REFINING LLC, CHEYENNE REFINERY, CHEYENNE, WYOMING**

| Quarter | Equipment Description | Percent Aqueous | Percent Organic | Hydrocarbon Density (lbs/ft ³) | Benzene Concentration Aqueous (mg/L) | Benzene Concentration Organic (mg/kg) | Total Benzene In Waste (ppmw) | Flow (gal/min) | Quarterly Estimated Uncontrolled BQ (Mg/yr) | Total Annual Estimated Uncontrolled BQ (Mg/yr) |
|---------|---------------------------------|-----------------|-----------------|--|--------------------------------------|---------------------------------------|-------------------------------|----------------|---|--|
| 1Q 2014 | API Effluent (Total) | 99.73 | 0.27 | 55.44 | 2.76 | 371.59 | 3.66 | 583.92 | 0.4742 | 1.8969 |
| | Desalter Effluent (Controlled) | 99.22 | 0.78 | 55.44 | 19.27 | 1926.67 | 32.54 | 28.63 | x 4 = | |
| | Coker API Effluent (Controlled) | 99.00 | 1.00 | 55.44 | 1.09 | 108.77 | 2.05 | 107.40 | | |
| | Groundwater (Controlled) | 99.95 | 0.05 | 55.44 | 1.09 | 109.00 | 1.14 | 30.00 | | |
| 2Q 2014 | API Effluent (Total) | 99.18 | 0.82 | 57.09 | 2.00 | 213.22 | 3.59 | 587.2 | + 0.2445 | 1.4374 |
| | Desalter Effluent (Controlled) | 99.22 | 0.78 | 57.09 | 18.37 | 1836.67 | 27.98 | 43.53 | x 2 = | |
| | Coker API Effluent (Controlled) | 99.00 | 1.00 | 57.09 | 1.23 | 123.07 | 2.35 | 106.14 | | |
| | Groundwater (Controlled) | 99.95 | 0.05 | 57.09 | 4.73 | 473.10 | 4.95 | 30.00 | | |

quarterly limit = 1.5 Mg

**2014 Q1 UNCONTROLLED WASTE STREAMS >0.05 MG
FRONTIER REFINING LLC, CHEYENNE REFINERY, CHEYENNE, WYOMING**

| Quarter | Equipment Description | Percent Aqueous | Percent Organic | Hydrocarbon Density (lbs/ft ³) | Benzene Concentration Aqueous (mg/L) | Benzene Concentration Organic (mg/kg) | Total Benzene in Waste (ppmw) | Flow (gal/min) | Total Annual Estimated Uncontrolled BQ (Mg/yr) |
|---------|-----------------------|-----------------|-----------------|--|--------------------------------------|---------------------------------------|-------------------------------|----------------|--|
| 1Q 2014 | Tank 34 | 95.00 | 5.00 | 48.69 | 95.30 | 9530.00 | 467.50 | 0.00008 | 0.00007 |
| | Flare Knockout | 80.00 | 20.00 | 51.04 | 3.50 | 350.33 | 62.38 | 0.00 | 0.00000 |
| | P-528A/B | 0.00 | 100.00 | 45.04 | 19.82 | 1982.00 | 1982.01 | 0.00 | 0.00000 |

**2014 Q2 UNCONTROLLED WASTE STREAMS >0.05 MG
FRONTIER REFINING LLC, CHEYENNE REFINERY, CHEYENNE, WYOMING**

| Quarter | Equipment Description | Percent Aqueous | Percent Organic | Hydrocarbon Density (lbs/ft ³) | Benzene Concentration Aqueous (mg/L) | Benzene Concentration Organic (mg/kg) | Total Benzene in Waste (ppmw) | Flow (gal/min) | Total Annual Estimated Uncontrolled BQ (Mg/yr) |
|---------|-----------------------|-----------------|-----------------|--|--------------------------------------|---------------------------------------|-------------------------------|----------------|--|
| 2Q 2014 | Tank 34 | 95.00 | 5.00 | 48.69 | 53.60 | 5360.00 | 262.94 | 0.00008 | 0.00004 |
| | Flare Knockout | 80.00 | 20.00 | 47.77 | 17.31 | 1731.27 | 292.62 | 0.00 | 0.00000 |
| | P-528A/B | 0.00 | 100.00 | 43.99 | 32.59 | 3259.00 | 3259.01 | 0.00 | 0.00000 |



Certificate of Completion

**This document certifies that
Calvin Williams**

**has completed Trihydro's training program for
Method 25D**

Awarded: 4/4/2014



Certificate of Completion

This document certifies that
Will Scaggari

has completed Trihydro's training program for
Method 25D

Awarded: 4/15/2013



Certificate of Completion

This document certifies that
Korey Kennedy

has completed Trihydro's training program for
Method 25D

Awarded: 4/16/2013



Certificate of Completion

This document certifies that
Jacob Berreth

has completed Trihydro's training program for
Method 25D

Awarded: 12/2/2013

Section B – FCCU

CEMS Data

Lab Reports

Frontier Refining LLC
P.O. Box 1588 • Cheyenne, WY 82003-1588

Report Period January 1 – July 31, 2014

| Paragraph | Attachment B - FCCU | Comments |
|-----------|--|---|
| 217g | SO ₂ , NO _x , CO and PM emissions in tons per year for each FCCU, | Emissions information contained in this section. |
| 217h | for each of the estimates or calculations in Subparagraphs 217.a. through 217.g. above, the basis for the emissions estimate or calculation (i.e. stack tests, CEMS, emission factor, etc.). | Basis for the emission estimate or calculation is included with the emission information. |
| 218a | for operating units emissions limits that are required by this Consent Decree and monitored with CEMS, for each CEMS: | CEM monitoring data is included in this section. |

1Q14

DEPARTMENT OF ENVIRONMENTAL QUALITY
AIR QUALITY DIVISION
CONTINUOUS EMISSION MONITORING REPORT

FORM A

I. GENERAL INFORMATION

- A. Facility Name: FRONTIER REFINING LLC
B. Process Unit/Pollutant Monitored: NO_x MONITORING SYSTEM - FLUIDIZED CATALYTIC CRACKING UNIT (FCCU) REGENERATOR
C. Applicable Permit Number or Regulation: Consent Decree, MD-9640
D. Applicable Emission Limit: 21.9 lb/hr (7-day rolling average); 10.9 lb/hr (365-day rolling average); 120 ppmvd @ 0% O₂ (7-day rolling average); 60ppmvd @ 0% O₂ (365-day rolling average)

II. MONITOR INFORMATION

- A. Date of Original Monitor Installation: 6/5/2012
- B. Date of Latest Monitor Certification: 7/17/2012
- C. Pollutant/Opacity Monitor
1. Manufacturer: Teledyne/API
 2. Model Number: Model 200H
 3. Serial Number Main Chassis: 82
 4. Basis of Measurement (If Applicable - Wet or Dry): Dry
 5. Instrument Span, Range Value (Specify Units): 0-600 ppm and 0-150 lb/hr
- D. Diluent Monitor NONE
1. Type of Monitor: O₂ or CO₂ (circle one)
 2. Manufacturer:
 3. Model Number:
 4. Serial Number Main Chassis
 5. Basis of Measurement (If Applicable - Wet or Dry):
 6. Instrument Span, Range Value (Specify Units): _____
- E. Flow Monitor
1. Type of Instrument (i.e. S-type Pitot Tube): S-Type Pitot Tube
 2. Manufacturer: Dieterich Standard
 3. Model Number: PSF-S4H HSVH FADH0 FADC
 4. Serial Number Main Chassis: DFCH CEM 1MN 2XX #MN 4MN P1 ES RB TR AR YX ZS DB
- F. Quality Assurance Data
1. QA Plan Date: 10/15/2012
 2. QA Plan Approval Date: 4/22/2013

III. Operating/Monitoring Data

A. Quarter: 1 Year: 2014

B Total Hours in Reporting Period: 2160

C. Hours Unit Operated During the Reporting Period: 1902

Note: Include all unit operating time for the quarter including operating time associated with Startup/Shutdown and Chapter 1 Section 5 (Emergency/Abnormal) Operations. Report time in hours to one decimal place, i.e. 1902.8.

IV. Quarterly Audits/Monitoring System Modifications

A. Quarterly Audits

Type Audit: CGA

| | | |
|----------------------------|---|---------------------------|
| Pollutant/Opacity Monitor: | <u>Date Conducted</u> <u>3/20/2014</u> | <u>Pass</u> <u>YES</u> |
|----------------------------|---|---------------------------|

Note: A copy of the quarterly audits shall be included with the corresponding quarterly excess emission report.

Equipment Replaced During Reporting Period: Changed out Filters; Changed out NO_x Span Calibration Bottle; Replaced Sample Line Temperature Transmitter.

Note: Only equipment replacements or modifications to the system that could affect the ability of the continuous monitoring system to comply with the associated Performance Specification shall be reported.

V. Report Contact

A. Name: David Weeks, Environmental Engineer

B. Phone Number: (307) 771-8827

1Q14

EXCESS EMISSION SUMMARY REPORT
FCCU NO_x (lb/hr) CEMS
7-day rolling average = 21.9 lb/hr

FORM B

| Emission Data Summary | | CMS Performance Report | |
|--|-------------|---|-------------|
| I. Duration of Excess Emission in Reporting Period Due to: | | I. CMS Downtime in Reporting Period Due to: | |
| A. Startup/Shutdown | 0.0 | A. Monitor Equipment Malfunction | 12.0 |
| B. Control Equipment Problems | 0.0 | B. Non-Monitor Equipment Malfunctions | 4.0 |
| C. Process Problem | 0.0 | C. Quality Assurance Calibration | 1.0 |
| D. Other Known Causes | 0.0 | D. Other Known Causes | 2.0 |
| E. Unknown Causes | 0.0 | E. Unknown Causes | 0.0 |
| II. Total Duration of Excess Emission | 0.0 | II. Total CMS Downtime | 19.0 |
| III. Total Duration of Excess Emissions x 100 divided by Total Source Operating Time minus Total CMS Downtime | 0.0% | III. Total CMS Downtime x 100 divided by Total Source Operating Time | 1.0% |

Total time of excess emission events due to emergency/abnormal operations: 0.

NOTE:

1. Only report excess emissions which occur when the unit/process is operating. Include all excess emissions in the Emission Data Summary including those excess emissions associated with startup/shutdown and those excess emissions associated with Chapter 1 Section 5 (Emergency/Abnormal) operations. Report times in hours for gaseous monitors and in tenths of an hour for opacity monitors. Include detailed excess emission information and causes in the Excess Emission Table (Form C).
2. Only report CEM downtime which occurs while the unit/process is operating. Report time in hours to one decimal point. Include detailed CEM downtime and causes in the Monitor Outage Table (Form D).
3. Include an explanation of what corrective actions were taken for total excess emissions or monitor downtime for the quarter (Emission Data Summary and CMS Performance Summary, Item III) greater than 5%. (See Instructions for further details.)
4. Rolling 7-day and 365-day averages are calculated for each day the emission source is operating, including days when the analyzer has downtime. A null value is used for days in a rolling average period where the unit is not operating or the CEMS downtime causes insufficient data for a valid daily average. This can result in a day where the data is considered to be both an excess emission and analyzer downtime.

1Q14 FCCU CEMS

NO_x lb/hr

7-Day Rolling Average

***Form C – Excess Emission
Summary***

FCCU Excess Emissions Summary

Frontier Refining LLC

NOx lbs 7-Day Rolling Excess Emissions for 1/1/2014 thru 3/31/2014

| Reason | Duration |
|---|-------------------|
| <i>There are no excess emissions for this report.</i> | |
| Total duration of NOx lbs 7-Day Rolling excess emissions | 0 |
| Total operating time | 1902 hours |
| Operating time with excess emissions | 0.0% |

1Q14

EXCESS EMISSION SUMMARY REPORT**FCCU NO_x (lb/hr) CEMS****365-day rolling average = 10.9 lb/hr****FORM B**

| Emission Data Summary | | CMS Performance Report | |
|--|-------------|---|-------------|
| I. Duration of Excess Emission in Reporting Period Due to: | | I. CMS Downtime in Reporting Period Due to: | |
| A. Startup/Shutdown | 0.0 | A. Monitor Equipment Malfunction | 12.0 |
| B. Control Equipment Problems | 0.0 | B. Non-Monitor Equipment Malfunctions | 4.0 |
| C. Process Problem | 0.0 | C. Quality Assurance Calibration | 1.0 |
| D. Other Known Causes | 0.0 | D. Other Known Causes | 2.0 |
| E. Unknown Causes | 0.0 | E. Unknown Causes | 0.0 |
| II. Total Duration of Excess Emission | 0.0 | II. Total CMS Downtime | 19.0 |
| III. Total Duration of Excess Emissions x 100 divided by Total Source Operating Time minus Total CMS Downtime | 0.0% | III. Total CMS Downtime x 100 divided by Total Source Operating Time | 1.0% |

Total time of excess emission events due to emergency/abnormal operations: 0.**NOTE:**

1. Only report excess emissions which occur when the unit/process is operating. Include all excess emissions in the Emission Data Summary including those excess emissions associated with startup/shutdown and those excess emissions associated with Chapter 1 Section 5 (Emergency/Abnormal) operations. Report times in hours for gaseous monitors and in tenths of an hour for opacity monitors. Include detailed excess emission information and causes in the Excess Emission Table (Form C).
2. Only report CEM downtime which occurs while the unit/process is operating. Report time in hours to one decimal point. Include detailed CEM downtime and causes in the Monitor Outage Table (Form D).
3. Include an explanation of what corrective actions were taken for total excess emissions or monitor downtime for the quarter (Emission Data Summary and CMS Performance Summary, Item III) greater than 5%. (See Instructions for further details.)
4. Rolling 7-day and 365-day averages are calculated for each day the emission source is operating, including days when the analyzer has downtime. A null value is used for days in a rolling average period where the unit is not operating or the CEMS downtime causes insufficient data for a valid daily average. This can result in a day where the data is considered to be both an excess emission and analyzer downtime.

1Q14 FCCU CEMS

NOx lb/hr

365-Day Rolling Average

***Form C – Excess Emission
Summary***

FCCU Excess Emissions Summary

Frontier Refining LLC

NOx lbs 365-Day Rolling Excess Emissions for 1/1/2014 thru 3/31/2014

| Reason | Duration |
|--|-----------------|
| <i>There are no excess emissions for this report.</i> | |
| Total duration of NOx lbs 365-Day Rolling excess emissions | 0 |
| Total operating time | 1902 hours |
| Operating time with excess emissions | 0.0% |

1Q14 FCCU CEMS

NO_x Lb/Hr

Form D – Downtime Summary

FCCU CEMS Downtime Summary

Frontier Refining LLC
NOx lbs CEMS Downtime for 1/1/2014 thru 3/31/2014

| Reason | Duration |
|--|-------------------|
| CISCO Technician inadvertently triggered a calibration on the FCCU CEMS while working on the Crude Charge Heater CEMS causing the data to go OOC | 1 hour |
| Cylinder Gas Audit (CGA) | 1 hour |
| Maintenance - High Stack Vacuum | 1 hour |
| NOx and SO2 Lb/Hr Data Invalid - Formula Input Out of Range | 3 hours |
| NOx lb/hr & SO2 lb/hr Invalid Data - Low Excess O2 - Formula Input Out of Range | 1 hour |
| Unit Start-up - Analyzer Calibration Checks Failed | 12 hours |
| Total duration of NOx lbs CEMS downtime | 19 hours |
| Total operating time | 1902 hours |
| Operating time with CEMS downtime | 1.0% |

FCCU CEMS Downtime
Frontier Refining LLC
NOx lbs CEMS Downtime for 1/1/2014 thru 3/31/2014

| Parameter | Start | End | Duration | Reason | Action |
|----------------|--------------------|----------|----------|--|---|
| NOx lbs | 1/4/2014 8:00 AM | 10:59 AM | 3 hours | NOx and SO2 Lb/Hr Data Invalid - Formula Input Out of Range | Adjusted Excess O2 |
| NOx lbs | 1/6/2014 9:00 AM | 9:59 AM | 1 hour | NOx lb/hr & SO2 lb/hr Invalid Data - Low Excess O2 - Formula Input Out of Range | Adjusted Excess O2 |
| NOx lbs | 1/8/2014 9:00 AM | 9:59 AM | 1 hour | Maintenance - High Stack Vacuum | Changed out sample filters both at the probe and the cabinet. Blew out sample line. |
| NOx lbs | 1/21/2014 1:00 PM | 1:59 PM | 1 hour | CISCO Technician inadvertently triggered a calibration on the FCCU CEMS while working on the Crude Charge Heater CEMS causing the data to go OOC | Ran Manual Calibration |
| NOx lbs | 2/16/2014 12:00 AM | 11:59 AM | 12 hours | Unit Start-up - Analyzer Calibration Checks Failed | Ran Manual Calibration |
| NOx lbs | 3/20/2014 9:00 AM | 9:59 AM | 1 hour | Cylinder Gas Audit (CGA) | Performed NOx, SO2, CO & O2 CGA |
| Total duration | | | 19 hours | | |

1Q14

EXCESS EMISSION SUMMARY REPORT
FCCU NO_x (ppm) CEMS
7-day Rolling Average = 120 ppmvd @ 0% O₂

FORM B

| Emission Data Summary | | CMS Performance Report | |
|--|-------------|---|-------------|
| I. Duration of Excess Emission in Reporting Period Due to: | | I. CMS Downtime in Reporting Period Due to: | |
| A. Startup/Shutdown | 48.0 | A. Monitor Equipment Malfunction | 0.0 |
| B. Control Equipment Problems | 0.0 | B. Non-Monitor Equipment Malfunctions | 11.0 |
| C. Process Problem | 0.0 | C. Quality Assurance Calibration | 1.0 |
| D. Other Known Causes | 0.0 | D. Other Known Causes | 1.0 |
| E. Unknown Causes | 0.0 | E. Unknown Causes | 0.0 |
| II. Total Duration of Excess Emission | 48.0 | II. Total CMS Downtime | 13.0 |
| III. Total Duration of Excess Emissions x 100 divided by Total Source Operating Time minus Total CMS Downtime | 2.5% | III. Total CMS Downtime x 100 divided by Total Source Operating Time | 0.7% |

Total time of excess emission events due to emergency/abnormal operations: 0.

NOTE:

- Only report excess emissions which occur when the unit/process is operating. Include all excess emissions in the Emission Data Summary including those excess emissions associated with startup/shutdown and those excess emissions associated with Chapter 1 Section 5 (Emergency/Abnormal) operations. Report times in hours for gaseous monitors and in tenths of an hour for opacity monitors. Include detailed excess emission information and causes in the Excess Emission Table (Form C).
- Only report CEM downtime which occurs while the unit/process is operating. Report time in hours to one decimal point. Include detailed CEM downtime and causes in the Monitor Outage Table (Form D).
- Include an explanation of what corrective actions were taken for total excess emissions or monitor downtime for the quarter (Emission Data Summary and CMS Performance Summary, Item III) greater than 5%. (See Instructions for further details.)
- Rolling 7-day and 365-day averages are calculated for each day the emission source is operating, including days when the analyzer has downtime. A null value is used for days in a rolling average period where the unit is not operating or the CEMS downtime causes insufficient data for a valid daily average. This can result in a day where the data is considered to be both an excess emission and analyzer downtime.

1Q14 FCCU CEMS

***NOx ppm @ 0% O2
7-Day Rolling Average***

***Form C – Excess Emission
Summary***

FCCU Excess Emissions Summary

Frontier Refining LLC

NOx ppm @0% O2 7-Day Rolling Excess Emissions for 1/1/2014 thru 3/31/2014

| Reason | Duration |
|--|-------------------|
| Emission Exceedence - NOx ppm @ 0% O2 7-Day Rolling Average | 48 hours |
| Total duration of NOx ppm @0% O2 7-Day Rolling excess emissions | 48 hours |
| Total operating time | 1902 hours |
| Operating time with excess emissions | 2.5% |

FCCU Excess Emissions

Frontier Refining LLC

NOx ppm @0% O2 7-Day Rolling Excess Emissions for 1/1/2014 thru 3/31/2014

| Parameter | Start | End | Duration | Value | Min | Max | Limit | Reason | Action |
|------------------------------|-----------|----------|----------|-------|------|------|-------|---|---|
| NOx ppm @0% O2 7-Day Rolling | 2/16/2014 | 11:59 PM | 24 hours | 81.0 | 81.0 | 81.0 | 120 | Emission Exceedence - NOx ppm @ 0% O2 7-Day Rolling Average | Lowered Excess O2; Added DeNOx Additive; Increased Stripping Steam; Added CGO to Feed |
| NOx ppm @0% O2 7-Day Rolling | 2/17/2014 | 11:59 PM | 24 hours | 86.8 | 86.8 | 86.8 | 120 | Emission Exceedence - NOx ppm @ 0% O2 7-Day Rolling Average | Lowered Excess O2; Added DeNOx Additive; Increased Stripping Steam; Added CGO to Feed |
| Total duration | | | 48 hours | | | | | | |

1Q14

EXCESS EMISSION SUMMARY REPORT
FCCU NO_x (ppm) CEMS
365-day rolling average = 60 ppmvd @ 0% O₂

FORM B

| Emission Data Summary | | CMS Performance Report | |
|--|---------------|---|-------------|
| I. Duration of Excess Emission in Reporting Period Due to: | | I. CMS Downtime in Reporting Period Due to: | |
| A. Startup/Shutdown | 0.0 | A. Monitor Equipment Malfunction | 0.0 |
| B. Control Equipment Problems | 0.0 | B. Non-Monitor Equipment Malfunctions | 11.0 |
| C. Process Problem | 1015.0 | C. Quality Assurance Calibration | 1.0 |
| D. Other Known Causes | 0.0 | D. Other Known Causes | 1.0 |
| E. Unknown Causes | 0.0 | E. Unknown Causes | 0.0 |
| II. Total Duration of Excess Emission | 1015.0 | II. Total CMS Downtime | 13.0 |
| III. Total Duration of Excess Emissions x 100 divided by Total Source Operating Time minus Total CMS Downtime | 53.4% | III. Total CMS Downtime x 100 divided by Total Source Operating Time | 0.7% |

Total time of excess emission events due to emergency/abnormal operations: 0 .

NOTE:

1. Only report excess emissions which occur when the unit/process is operating. Include all excess emissions in the Emission Data Summary including those excess emissions associated with startup/shutdown and those excess emissions associated with Chapter 1 Section 5 (Emergency/Abnormal) operations. Report times in hours for gaseous monitors and in tenths of an hour for opacity monitors. Include detailed excess emission information and causes in the Excess Emission Table (Form C).
2. Only report CEM downtime which occurs while the unit/process is operating. Report time in hours to one decimal point. Include detailed CEM downtime and causes in the Monitor Outage Table (Form D).
3. Include an explanation of what corrective actions were taken for total excess emissions or monitor downtime for the quarter (Emission Data Summary and CMS Performance Summary, Item III) greater than 5%. (See Instructions for further details.)
4. Rolling 7-day and 365-day averages are calculated for each day the emission source is operating, including days when the analyzer has downtime. A null value is used for days in a rolling average period where the unit is not operating or the CEMS downtime causes insufficient data for a valid daily average. This can result in a day where the data is considered to be both an excess emission and analyzer downtime.

1Q14 FCCU CEMS

***NOx ppm @ 0% O2
365-Day Rolling Average***

***Form C – Excess Emission
Summary***

FCCU Excess Emissions Summary

Frontier Refining LLC

NOx ppm @0% O2 365-Day Rolling Excess Emissions for 1/1/2014 thru 3/31/2014

| Reason | Duration |
|--|-------------------|
| Emission Exceedence - NOx ppm @ 0% O2 365-Day Rolling Average | 1015 hours |
| Total duration of NOx ppm @0% O2 365-Day Rolling excess emissions | 1015 hours |
| Total operating time | 1902 hours |
| Operating time with excess emissions | 53.4% |

FCCU Excess Emissions

Frontier Refining LLC

NOx ppm @0% O2 365-Day Rolling Excess Emissions for 1/1/2014 thru 3/31/2014

| Parameter | Start | End | Duration | Value | Min | Max | Limit | Reason | Action |
|-----------------------------------|----------|----------|----------|-------|------|------|-------|--|---|
| NOx ppm @0% O2 365-Day Rolling | 1/1/2014 | 11:59 PM | 24 hours | 64.0 | 64.0 | 64.0 | 60 | Emission Exceedence - NOx ppm @ 0% O2 365-Day Rolling Average | Lowered Excess O2; Added DeNOx Additive; Increased Stripping Steam; Added CGO to Feed |
| NOx ppm @0% O2 365-Day Rolling | 1/2/2014 | 11:59 PM | 24 hours | 63.9 | 63.9 | 63.9 | 60 | Emission Exceedence - NOx ppm @ 0% O2 365-Day Rolling Average | Lowered Excess O2; Added DeNOx Additive; Increased Stripping Steam; Added CGO to Feed |
| NOx ppm @0% O2 365-Day Rolling | 1/3/2014 | 11:59 PM | 24 hours | 63.9 | 63.9 | 63.9 | 60 | Emission Exceedence - NOx ppm @ 0% O2 365-Day Rolling Average | Lowered Excess O2; Added DeNOx Additive; Increased Stripping Steam; Added CGO to Feed |
| NOx ppm @0% O2 365-Day Rolling | 1/4/2014 | 11:59 PM | 24 hours | 63.7 | 63.7 | 63.7 | 60 | Emission Exceedence - NOx ppm @ 0% O2 365-Day Rolling Average | Lowered Excess O2; Added DeNOx Additive; Increased Stripping Steam; Added CGO to Feed |
| NOx ppm @0% O2 365-Day Rolling | 1/5/2014 | 11:59 PM | 24 hours | 63.5 | 63.5 | 63.5 | 60 | Emission Exceedence - NOx ppm @ 0% O2 365-Day Rolling Average | Lowered Excess O2; Added DeNOx Additive; Increased Stripping Steam; Added CGO to Feed |
| NOx ppm @0% O2 365-Day Rolling | 1/6/2014 | 11:59 PM | 24 hours | 63.4 | 63.4 | 63.4 | 60 | Emission Exceedence - NOx ppm @ 0% O2 365-Day Rolling Average | Lowered Excess O2; Added DeNOx Additive; Increased Stripping Steam; Added CGO to Feed |
| NOx ppm @0% O2 365-Day Rolling | 1/7/2014 | 11:59 PM | 24 hours | 63.3 | 63.3 | 63.3 | 60 | Emission Exceedence - NOx ppm @ 0% O2 365-Day Rolling Average | Lowered Excess O2; Added DeNOx Additive; Increased Stripping Steam; Added CGO to Feed |

| Parameter | Start | End | Duration | Value | Min | Max | Limit | Reason | Action |
|-----------------------------------|-----------|----------|----------|-------|------|------|-------|--|---|
| NOx ppm @0% O2 365-Day Rolling | 1/8/2014 | 11:59 PM | 24 hours | 63.2 | 63.2 | 63.2 | 60 | Emission Exceedence - NOx ppm @ 0% O2 365-Day Rolling Average | Lowered Excess O2; Added DeNOx Additive; Increased Stripping Steam; Added CGO to Feed |
| NOx ppm @0% O2 365-Day Rolling | 1/8/2014 | 11:59 PM | 24 hours | 63.1 | 63.1 | 63.1 | 60 | Emission Exceedence - NOx ppm @ 0% O2 365-Day Rolling Average | Lowered Excess O2; Added DeNOx Additive; Increased Stripping Steam; Added CGO to Feed |
| NOx ppm @0% O2 365-Day Rolling | 1/10/2014 | 11:59 PM | 24 hours | 63.0 | 63.0 | 63.0 | 60 | Emission Exceedence - NOx ppm @ 0% O2 365-Day Rolling Average | Lowered Excess O2; Added DeNOx Additive; Increased Stripping Steam; Added CGO to Feed |
| NOx ppm @0% O2 365-Day Rolling | 1/11/2014 | 11:59 PM | 24 hours | 62.9 | 62.9 | 62.9 | 60 | Emission Exceedence - NOx ppm @ 0% O2 365-Day Rolling Average | Lowered Excess O2; Added DeNOx Additive; Increased Stripping Steam; Added CGO to Feed |
| NOx ppm @0% O2 365-Day Rolling | 1/12/2014 | 11:59 PM | 24 hours | 62.8 | 62.8 | 62.8 | 60 | Emission Exceedence - NOx ppm @ 0% O2 365-Day Rolling Average | Lowered Excess O2; Added DeNOx Additive; Increased Stripping Steam; Added CGO to Feed |
| NOx ppm @0% O2 365-Day Rolling | 1/13/2014 | 11:59 PM | 24 hours | 62.9 | 62.9 | 62.9 | 60 | Emission Exceedence - NOx ppm @ 0% O2 365-Day Rolling Average | Lowered Excess O2; Added DeNOx Additive; Increased Stripping Steam; Added CGO to Feed |
| NOx ppm @0% O2 365-Day Rolling | 1/14/2014 | 11:59 PM | 24 hours | 62.9 | 62.9 | 62.9 | 60 | Emission Exceedence - NOx ppm @ 0% O2 365-Day Rolling Average | Lowered Excess O2; Added DeNOx Additive; Increased Stripping Steam; Added CGO to Feed |
| NOx ppm @0% O2 365-Day Rolling | 1/15/2014 | 11:59 PM | 24 hours | 62.8 | 62.8 | 62.8 | 60 | Emission Exceedence - NOx ppm @ 0% O2 365-Day Rolling Average | Lowered Excess O2; Added DeNOx Additive; Increased Stripping Steam; Added CGO to Feed |

| Parameter | Start | End | Duration | Value | Min | Max | Limit | Reason | Action |
|-----------------------------------|-----------|----------|----------|-------|------|------|-------|--|---|
| NOx ppm @0% O2 365-Day Rolling | 1/18/2014 | 11:59 PM | 24 hours | 62.8 | 62.8 | 62.8 | 60 | Emission Exceedence - NOx ppm @ 0% O2 365-Day Rolling Average | Lowered Excess O2; Added DeNOx Additive; Increased Stripping Steam; Added CGO to Feed |
| NOx ppm @0% O2 365-Day Rolling | 1/17/2014 | 11:59 PM | 24 hours | 62.7 | 62.7 | 62.7 | 60 | Emission Exceedence - NOx ppm @ 0% O2 365-Day Rolling Average | Lowered Excess O2; Added DeNOx Additive; Increased Stripping Steam; Added CGO to Feed |
| NOx ppm @0% O2 365-Day Rolling | 1/18/2014 | 11:59 PM | 24 hours | 62.6 | 62.6 | 62.6 | 60 | Emission Exceedence - NOx ppm @ 0% O2 365-Day Rolling Average | Lowered Excess O2; Added DeNOx Additive; Increased Stripping Steam; Added CGO to Feed |
| NOx ppm @0% O2 365-Day Rolling | 1/19/2014 | 11:59 PM | 24 hours | 62.5 | 62.5 | 62.5 | 60 | Emission Exceedence - NOx ppm @ 0% O2 365-Day Rolling Average | Lowered Excess O2; Added DeNOx Additive; Increased Stripping Steam; Added CGO to Feed |
| NOx ppm @0% O2 365-Day Rolling | 1/20/2014 | 11:59 PM | 24 hours | 62.6 | 62.6 | 62.6 | 60 | Emission Exceedence - NOx ppm @ 0% O2 365-Day Rolling Average | Lowered Excess O2; Added DeNOx Additive; Increased Stripping Steam; Added CGO to Feed |
| NOx ppm @0% O2 365-Day Rolling | 1/21/2014 | 11:59 PM | 24 hours | 62.5 | 62.5 | 62.5 | 60 | Emission Exceedence - NOx ppm @ 0% O2 365-Day Rolling Average | Lowered Excess O2; Added DeNOx Additive; Increased Stripping Steam; Added CGO to Feed |
| NOx ppm @0% O2 365-Day Rolling | 1/22/2014 | 11:59 PM | 24 hours | 62.5 | 62.5 | 62.5 | 60 | Emission Exceedence - NOx ppm @ 0% O2 365-Day Rolling Average | Lowered Excess O2; Added DeNOx Additive; Increased Stripping Steam; Added CGO to Feed |
| NOx ppm @0% O2 365-Day Rolling | 1/23/2014 | 11:59 PM | 24 hours | 62.5 | 62.5 | 62.5 | 60 | Emission Exceedence - NOx ppm @ 0% O2 365-Day Rolling Average | Lowered Excess O2; Added DeNOx Additive; Increased Stripping Steam; Added CGO to Feed |

| Parameter | Start | End | Duration | Value | Min | Max | Limit | Reason | Action |
|-----------------------------------|-----------|----------|----------|-------|------|------|-------|--|---|
| NOx ppm @0% O2 365-Day Rolling | 1/24/2014 | 11:59 PM | 24 hours | 62.5 | 62.5 | 62.5 | 60 | Emission Exceedence - NOx ppm @ 0% O2 365-Day Rolling Average | Lowered Excess O2; Added DeNOx Additive; Increased Stripping Steam; Added CGO to Feed |
| NOx ppm @0% O2 365-Day Rolling | 1/25/2014 | 11:59 PM | 24 hours | 62.5 | 62.5 | 62.5 | 60 | Emission Exceedence - NOx ppm @ 0% O2 365-Day Rolling Average | Lowered Excess O2; Added DeNOx Additive; Increased Stripping Steam; Added CGO to Feed |
| NOx ppm @0% O2 365-Day Rolling | 1/26/2014 | 11:59 PM | 24 hours | 62.4 | 62.4 | 62.4 | 60 | Emission Exceedence - NOx ppm @ 0% O2 365-Day Rolling Average | Lowered Excess O2; Added DeNOx Additive; Increased Stripping Steam; Added CGO to Feed |
| NOx ppm @0% O2 365-Day Rolling | 1/27/2014 | 11:59 PM | 24 hours | 62.3 | 62.3 | 62.3 | 60 | Emission Exceedence - NOx ppm @ 0% O2 365-Day Rolling Average | Lowered Excess O2; Added DeNOx Additive; Increased Stripping Steam; Added CGO to Feed |
| NOx ppm @0% O2 365-Day Rolling | 1/28/2014 | 11:59 PM | 24 hours | 62.3 | 62.3 | 62.3 | 60 | Emission Exceedence - NOx ppm @ 0% O2 365-Day Rolling Average | Lowered Excess O2; Added DeNOx Additive; Increased Stripping Steam; Added CGO to Feed |
| NOx ppm @0% O2 365-Day Rolling | 1/29/2014 | 11:59 PM | 24 hours | 62.2 | 62.2 | 62.2 | 60 | Emission Exceedence - NOx ppm @ 0% O2 365-Day Rolling Average | Lowered Excess O2; Added DeNOx Additive; Increased Stripping Steam; Added CGO to Feed |
| NOx ppm @0% O2 365-Day Rolling | 1/30/2014 | 11:59 PM | 24 hours | 62.2 | 62.2 | 62.2 | 60 | Emission Exceedence - NOx ppm @ 0% O2 365-Day Rolling Average | Lowered Excess O2; Added DeNOx Additive; Increased Stripping Steam; Added CGO to Feed |
| NOx ppm @0% O2 365-Day Rolling | 1/31/2014 | 11:59 PM | 24 hours | 62.1 | 62.1 | 62.1 | 60 | Emission Exceedence - NOx ppm @ 0% O2 365-Day Rolling Average | Lowered Excess O2; Added DeNOx Additive; Increased Stripping Steam; Added CGO to Feed |

| Parameter | Start | End | Duration | Value | Min | Max | Limit | Reason | Action |
|-----------------------------------|-----------|----------|----------|-------|------|------|-------|--|---|
| NOx ppm @0% O2 365-Day Rolling | 2/1/2014 | 11:59 PM | 24 hours | 62.1 | 62.1 | 62.1 | 60 | Emission Exceedence - NOx ppm @ 0% O2 365-Day Rolling Average | Lowered Excess O2; Added DeNOx Additive; Increased Stripping Steam; Added CGO to Feed |
| NOx ppm @0% O2 365-Day Rolling | 2/2/2014 | 11:59 PM | 24 hours | 62.0 | 62.0 | 62.0 | 60 | Emission Exceedence - NOx ppm @ 0% O2 365-Day Rolling Average | Lowered Excess O2; Added DeNOx Additive; Increased Stripping Steam; Added CGO to Feed |
| NOx ppm @0% O2 365-Day Rolling | 2/3/2014 | 11:59 PM | 24 hours | 61.8 | 61.8 | 61.8 | 60 | Emission Exceedence - NOx ppm @ 0% O2 365-Day Rolling Average | Lowered Excess O2; Added DeNOx Additive; Increased Stripping Steam; Added CGO to Feed |
| NOx ppm @0% O2 365-Day Rolling | 2/4/2014 | 11:59 PM | 24 hours | 61.8 | 61.8 | 61.8 | 60 | Emission Exceedence - NOx ppm @ 0% O2 365-Day Rolling Average | Lowered Excess O2; Added DeNOx Additive; Increased Stripping Steam; Added CGO to Feed |
| NOx ppm @0% O2 365-Day Rolling | 2/5/2014 | 7:59 AM | 8 hours | 61.8 | 61.8 | 61.8 | 60 | Emission Exceedence - NOx ppm @ 0% O2 365-Day Rolling Average | Lowered Excess O2; Added DeNOx Additive; Increased Stripping Steam; Added CGO to Feed |
| NOx ppm @0% O2 365-Day Rolling | 2/18/2014 | 11:59 PM | 24 hours | 61.8 | 61.8 | 61.8 | 60 | Emission Exceedence - NOx ppm @ 0% O2 365-Day Rolling Average | Lowered Excess O2; Added DeNOx Additive; Increased Stripping Steam; Added CGO to Feed |
| NOx ppm @0% O2 365-Day Rolling | 2/19/2014 | 11:59 PM | 24 hours | 61.6 | 61.6 | 61.6 | 60 | Emission Exceedence - NOx ppm @ 0% O2 365-Day Rolling Average | Lowered Excess O2; Added DeNOx Additive; Increased Stripping Steam; Added CGO to Feed |
| NOx ppm @0% O2 365-Day Rolling | 2/20/2014 | 11:59 PM | 24 hours | 61.3 | 61.3 | 61.3 | 60 | Emission Exceedence - NOx ppm @ 0% O2 365-Day Rolling Average | Lowered Excess O2; Added DeNOx Additive; Increased Stripping Steam; Added CGO to Feed |

| Parameter | Start | End | Duration | Value | Min | Max | Limit | Reason | Action |
|-----------------------------------|-----------|----------|------------|-------|------|------|-------|--|---|
| NOx ppm @0% O2 365-Day Rolling | 2/21/2014 | 11:59 PM | 24 hours | 61.0 | 61.0 | 61.0 | 60 | Emission Exceedence - NOx ppm @ 0% O2 365-Day Rolling Average | Lowered Excess O2; Added DeNOx Additive; Increased Stripping Steam; Added CGO to Feed |
| NOx ppm @0% O2 365-Day Rolling | 2/22/2014 | 11:59 PM | 24 hours | 60.7 | 60.7 | 60.7 | 60 | Emission Exceedence - NOx ppm @ 0% O2 365-Day Rolling Average | Lowered Excess O2; Added DeNOx Additive; Increased Stripping Steam; Added CGO to Feed |
| NOx ppm @0% O2 365-Day Rolling | 2/23/2014 | 11:59 PM | 24 hours | 60.5 | 60.5 | 60.5 | 60 | Emission Exceedence - NOx ppm @ 0% O2 365-Day Rolling Average | Lowered Excess O2; Added DeNOx Additive; Increased Stripping Steam; Added CGO to Feed |
| NOx ppm @0% O2 365-Day Rolling | 2/24/2014 | 10:59 PM | 23 hours | 60.2 | 60.2 | 60.2 | 60 | Emission Exceedence - NOx ppm @ 0% O2 365-Day Rolling Average | Lowered Excess O2; Added DeNOx Additive; Increased Stripping Steam; Added CGO to Feed |
| Total duration | | | 1015 hours | | | | | | |

1Q14 FCCU CEMS

NOx ppm @ 0% O2

Form D – Downtime Summary

FCCU CEMS Downtime Summary

Frontier Refining LLC

NOx ppm @0% O2 CEMS Downtime for 1/1/2014 thru 3/31/2014

| Reason | Duration |
|---|-------------------|
| CISCO Technician inadvertently triggered a calibration on the FCCU CEMS while working on the Crude Charge Heater CEMS causing the data to go OOC | 1 hour |
| Cylinder Gas Audit (CGA) | 1 hour |
| Unit Start-up - Analyzer Calibration Checks Failed | 11 hours |
| Total duration of NOx ppm @0% O2 CEMS downtime | 13 hours |
| Total operating time | 1902 hours |
| Operating time with CEMS downtime | 0.7% |

FCCU CEMS Downtime

Frontier Refining LLC

NOx ppm @0% O2 CEMS Downtime for 1/1/2014 thru 3/31/2014

| Parameter | Start | End | Duration | Reason | Action |
|----------------|--------------------|----------|----------|--|---------------------------------|
| NOx ppm @0% O2 | 1/21/2014 1:00 PM | 1:59 PM | 1 hour | CISCO Technician inadvertently triggered a calibration on the FCCU CEMS while working on the Crude Charge Heater CEMS causing the data to go OOC | Ran Manual Calibration |
| NOx ppm @0% O2 | 2/18/2014 12:00 AM | 10:59 AM | 11 hours | Unit Start-up - Analyzer Calibration Checks Failed | Ran Manual Calibration |
| NOx ppm @0% O2 | 3/20/2014 9:00 AM | 9:59 AM | 1 hour | Cylinder Gas Audit (CGA) | Performed NOx, SO2, CO & O2 CGA |
| Total duration | | | 13 hours | | |

1Q14

DEPARTMENT OF ENVIRONMENTAL QUALITY
AIR QUALITY DIVISION
CONTINUOUS EMISSION MONITORING REPORT

FORM A

I. GENERAL INFORMATION

- A. Facility Name: FRONTIER REFINING LLC
B. Process Unit/Pollutant Monitored: SO₂ MONITORING SYSTEM - FLUIDIZED CATALYTIC CRACKING UNIT (FCCU) REGENERATOR
C. Applicable Permit Number or Regulation: MD-946
D. Applicable Emission Limit: 320 lb/hr SO₂ (1-hr average); 1401.6 tpy (calendar year)

II. MONITOR INFORMATION

A. Date of Original Monitor Installation: 6/5/2012

B. Date of Latest Monitor Certification: 7/17/2012

C. Pollutant/Opacity Monitor

1. Manufacturer: Teledyne/API
2. Model Number: Model 100H
3. Serial Number Main Chassis: 71
4. Basis of Measurement (If Applicable - Wet or Dry): Dry
5. Instrument Span, Range Value (Specify Units): 0-1800 ppm and 0-600 lb/hr

D. Diluent Monitor NONE

1. Type of Monitor: O₂ or CO₂ (circle one)
2. Manufacturer:
3. Model Number:
4. Serial Number Main Chassis
5. Basis of Measurement (If Applicable - Wet or Dry):
6. Instrument Span, Range Value (Specify Units): _____

E. Flow Monitor

1. Type of Instrument (i.e. S-type Pitot Tube): S-Type Pitot Tube
2. Manufacturer: Dieterich Standard
3. Model Number: PSF-S4H HSVH FADH0 FADC
4. Serial Number Main Chassis: DFCH CEM 1MN 2XX #MN 4MN P1 ES RB TR AR YX ZS DB

F. Quality Assurance Data

1. QA Plan Date: 10/15/2012
2. QA Plan Approval Date: 4/22/2013

III. Operating/Monitoring Data

A. Quarter: 1 Year: 2014

B. Total Hours in Reporting Period: 2160

C. Hours Unit Operated During the Reporting Period: 1902

Note: Include all unit operating time for the quarter including operating time associated with Startup/Shutdown and Chapter 1 Section 5 (Emergency/Abnormal) Operations. Report time in hours to one decimal place, i.e. 1902.8.

IV. Quarterly Audits/Monitoring System Modifications

A. Quarterly Audits
Type Audit: CGA

| | | |
|----------------------------|-----------------------|-------------|
| | <u>Date Conducted</u> | <u>Pass</u> |
| Pollutant/Opacity Monitor: | <u>3/20/2014</u> | <u>YES</u> |

Note: A copy of the quarterly audits shall be included with the corresponding quarterly excess emission report.

Equipment Replaced During Reporting Period: Changed out Filters; Changed out SO₂ Span Calibration Bottle; Replaced Sample Line Temperature Transmitter; Changed out SO₂ Analyzer Sample Pump.

Note: Only equipment replacements or modifications to the system that could affect the ability of the continuous monitoring system to comply with the associated Performance Specification shall be reported.

V. Report Contact

A. Name: David Weeks, Environmental Engineer

B. Phone Number: (307) 771-8827

1Q14

EMISSION SUMMARY REPORT
FCCU SO₂ (lb/hr) CEMS
1-hr average = 320 lb/hr

FORM B

| Emission Data Summary | | CMS Performance Report | |
|--|-------------|---|-------------|
| I. Duration of Excess Emission in Reporting Period Due to: | | I. CMS Downtime in Reporting Period Due to: | |
| A. Startup/Shutdown | 0.0 | A. Monitor Equipment Malfunction | 14.0 |
| B. Control Equipment Problems | 0.0 | B. Non-Monitor Equipment Malfunctions | 4.0 |
| C. Process Problem | 0.0 | C. Quality Assurance Calibration | 1.0 |
| D. Other Known Causes | 0.0 | D. Other Known Causes | 2.0 |
| E. Unknown Causes | 0.0 | E. Unknown Causes | 0.0 |
| II. Total Duration of Excess Emission | 0.0 | II. Total CMS Downtime | 21.0 |
| III. Total Duration of Excess Emissions x 100 divided by Total Source Operating Time minus Total CMS Downtime | 0.0% | III. Total CMS Downtime x 100 divided by Total Source Operating Time | 1.1% |

Total time of excess emission events due to emergency/abnormal operations: 0 .

NOTE:

1. Only report excess emissions which occur when the unit/process is operating. Include all excess emissions in the Emission Data Summary including those excess emissions associated with startup/shutdown and those excess emissions associated with Chapter 1 Section 5 (Emergency/Abnormal) operations. Report times in hours for gaseous monitors and in tenths of an hour for opacity monitors. Include detailed excess emission information and causes in the Excess Emission Table (Form C).
2. Only report CEM downtime which occurs while the unit/process is operating. Report time in hours to one decimal point. Include detailed CEM downtime and causes in the Monitor Outage Table (Form D).
3. Include an explanation of what corrective actions were taken for total excess emissions or monitor downtime for the quarter (Emission Data Summary and CMS Performance Summary, Item III) greater than 5%. (See Instructions for further details.)

1Q14 FCCU CEMS

SO₂ Lb/Hr

***Form C – Excess Emission
Summary***

FCCU Excess Emissions Summary

Frontier Refining LLC

SO2 lbs 1-Hr Excess Emissions for 1/1/2014 thru 3/31/2014

| Reason | Duration |
|--|-----------------|
| <i>There are no excess emissions for this report.</i> | |
| Total duration of SO2 lbs 1-Hr excess emissions | 0 |
| Total operating time | 1902 hours |
| Operating time with excess emissions | 0.0% |

1Q14 FCCU CEMS

SO2 Lb/Hr

Form D – Downtime Summary

FCCU CEMS Downtime Summary

Frontier Refining LLC

SO2 lbs CEMS Downtime for 1/1/2014 thru 3/31/2014

| Reason | Duration |
|--|-------------------|
| CISCO Technician inadvertently triggered a calibration on the FCCU CEMS while working on the Crude Charge Heater CEMS causing the data to go OOC | 1 hour |
| Cylinder Gas Audit (CGA) | 1 hour |
| Failed Morning SO2 Span Calibration Check | 2 hours |
| Maintenance - High Stack Vacuum | 1 hour |
| NOx and SO2 Lb/Hr Data Invalid - Formula Input Out of Range | 3 hours |
| NOx lb/hr & SO2 lb/hr Invalid Data - Low Excess O2 - Formula Input Out of Range | 1 hour |
| Unit Start-up - Analyzer Calibration Checks Failed | 12 hours |
| Total duration of SO2 lbs CEMS downtime | 21 hours |
| Total operating time | 1902 hours |
| Operating time with CEMS downtime | 1.1% |

FCCU CEMS Downtime
Frontier Refining LLC
SO2 lbs CEMS Downtime for 1/1/2014 thru 3/31/2014

| Parameter | Start | End | Duration | Reason | Action |
|----------------|--------------------|----------|----------|--|---|
| SO2 lbs | 1/4/2014 8:00 AM | 10:59 AM | 3 hours | NOx and SO2 Lb/Hr Data Invalid - Formula Input Out of Range | Adjusted Excess O2 |
| SO2 lbs | 1/6/2014 9:00 AM | 9:59 AM | 1 hour | NOx lb/hr & SO2 lb/hr Invalid Data - Low Excess O2 - Formula Input Out of Range | Adjusted Excess O2 |
| SO2 lbs | 1/8/2014 9:00 AM | 9:59 AM | 1 hour | Maintenance - High Stack Vacuum | Changed out sample filters both at the probe and the cabinet. Blew out sample line. |
| SO2 lbs | 1/21/2014 1:00 PM | 1:59 PM | 1 hour | CISCO Technician inadvertently triggered a calibration on the FCCU CEMS while working on the Crude Charge Heater CEMS causing the data to go OOC | Ran Manual Calibration |
| SO2 lbs | 2/16/2014 12:00 AM | 11:59 AM | 12 hours | Unit Start-up - Analyzer Calibration Checks Failed | Ran Manual Calibration |
| SO2 lbs | 2/17/2014 6:00 AM | 7:59 AM | 2 hours | Failed Morning SO2 Span Calibration Check | Adjusted SO2 Span, Ran Manual Calibration |
| SO2 lbs | 3/20/2014 9:00 AM | 9:59 AM | 1 hour | Cylinder Gas Audit (CGA) | Performed NOx, SO2, CO & O2 CGA |
| Total duration | | | 21 hours | | |

4Q13

DEPARTMENT OF ENVIRONMENTAL QUALITY
AIR QUALITY DIVISION
CONTINUOUS EMISSION MONITORING REPORT

FORM A

I. GENERAL INFORMATION

- A. Facility Name: FRONTIER REFINING LLC
B. Process Unit/Pollutant Monitored: CO MONITORING SYSTEM - FLUIDIZED CATALYTIC CRACKING UNIT (FCCU) REGENERATOR
C. Applicable Permit Number or Regulation: 3-0-149-2; MACT Subpart UUU; Consent Decree: MD-9640
D. Applicable Emission Limit: 500 ppm (1-hr); 500 ppmvd @ 0% O₂ (1-hr); 100 ppmvd @ 0% O₂ (365 day rolling average); 30 lb/hr (1-hr); 18.2 lb/hr (365 day rolling average)

II. MONITOR INFORMATION

- A. Date of Original Monitor Installation: 6/5/2012
B. Date of Latest Monitor Certification: 7/17/2012
C. Pollutant/Opacity Monitor
1. Manufacturer: Teledyne/API
2. Model Number: Model 300H
3. Serial Number Main Chassis: 186
4. Basis of Measurement (If Applicable - Wet or Dry): Dry
5. Instrument Span, Range Value (Specify Units): 0-1000 ppm
D. Diluent Monitor NONE
1. Type of Monitor: O₂ or CO₂ (circle one)
2. Manufacturer:
3. Model Number:
4. Serial Number Main Chassis:
5. Basis of Measurement (If Applicable - Wet or Dry):
6. Instrument Span, Range Value (Specify Units): _____
E. Flow Monitor
1. Type of Instrument (i.e. S-type Pitot Tube): S-Type Pitot Tube
2. Manufacturer: Dieterich Standard
3. Model Number: PSF-S4H HSVH FADH0 FADC
4. Serial Number Main Chassis: DFCII CEM 1MN 2XX #MN 4MN P1 ES RB TR AR YX ZS DB
F. Quality Assurance Data
1. QA Plan Date: 10/15/2012
2. QA Plan Approval Date: 4/22/2013

III. Operating/Monitoring Data

A. Quarter: 1 Year: 2014

B Total Hours in Reporting Period: 2160

C. Hours Unit Operated During the Reporting Period: 1902

Note: Include all unit operating time for the quarter including operating time associated with Startup/Shutdown and Chapter 1 Section 5 (Emergency/Abnormal) Operations. Report time in hours to one decimal place, i.e. 1902.8.

IV. Quarterly Audits/Monitoring System Modifications

A. Quarterly Audits

Type Audit: CGA

| | <u>Date Conducted</u> | <u>Pass</u> |
|----------------------------|-----------------------|-------------|
| Pollutant/Opacity Monitor: | <u>3/20/2014</u> | <u>YES</u> |

Note: A copy of the quarterly audits shall be included with the corresponding quarterly excess emission report.

B. Equipment Replaced During Reporting Period: Changed out Filters; Changed out CO Span Calibration Bottle; Replaced Sample Line Temperature Transmitter 1.

Note: Only equipment replacements or modifications to the system that could affect the ability of the continuous monitoring system to comply with the associated Performance Specification shall be reported.

V. Report Contact

A. Name: David Weeks, Environmental Engineer

B. Phone Number: (307) 771-8827

1Q14

EXCESS EMISSION SUMMARY REPORT
FCCU CO (ppm) (1-hr average) CEMS
1-hr average limit = 500 ppm

FORM B

| Emission Data Summary | | CMS Performance Report | |
|--|-------------|---|-------------|
| I. Duration of Excess Emission in Reporting Period Due to: | | I. CMS Downtime in Reporting Period Due to: | |
| A. Startup/Shutdown | 0.0 | A. Monitor Equipment Malfunction | 12.0 |
| B. Control Equipment Problems | 0.0 | B. Non-Monitor Equipment Malfunctions | 8.0 |
| C. Process Problem | 10.0 | C. Quality Assurance Calibration | 1.0 |
| D. Other Known Causes | 0.0 | D. Other Known Causes | 1.0 |
| E. Unknown Causes | 0.0 | E. Unknown Causes | 0.0 |
| II. Total Duration of Excess Emission | 10.0 | II. Total CMS Downtime | 22.0 |
| III. Total Duration of Excess Emissions x 100 divided by Total Source Operating Time minus Total CMS Downtime | 0.5% | III. Total CMS Downtime x 100 divided by Total Source Operating Time | 1.2% |

Total time of excess emission events due to emergency/abnormal operations: 0 .

NOTE:

1. Only report excess emissions which occur when the unit/process is operating. Include all excess emissions in the Emission Data Summary including those excess emissions associated with startup/shutdown and those excess emissions associated with Chapter 1 Section 5 (Emergency/Abnormal) operations. Report times in hours for gaseous monitors and in tenths of an hour for opacity monitors. Include detailed excess emission information and causes in the Excess Emission Table (Form C).
2. Only report CEM downtime which occurs while the unit/process is operating. Report time in hours to one decimal point. Include detailed CEM downtime and causes in the Monitor Outage Table (Form D).
3. Include an explanation of what corrective actions were taken for total excess emissions or monitor downtime for the quarter (Emission Data Summary and CMS Performance Summary, Item III) greater than 5%. (See Instructions for further details.)

1Q14 FCCU CEMS

CO ppm

***Form C – Excess Emission
Summary***

FCCU Excess Emissions Summary

Frontier Refining LLC

CO ppm 1-Hr Excess Emissions for 1/1/2014 thru 3/31/2014

| Reason | Duration |
|--|-------------------|
| CO ppm, CO ppm @ 0% O2, & CO lb/hr Emission Exceedance - Decreased total charge 1000 BPD due to unit pressure. Making adjustments for vacuum, on WGC surface condenser - Low Excess O2 | 2 hours |
| CO ppm, ppm @ 0% O2, & Lb/Hr Emission Exceedance - Increasing Rates - Low Excess O2 | 7 hours |
| Process Upset - Indeck Boilers #1 & #2 Shutdown | 1 hour |
| Total duration of CO ppm 1-Hr excess emissions | 10 hours |
| Total operating time | 1902 hours |
| Operating time with excess emissions | 0.5% |

FCCU Excess Emissions
Frontier Refining LLC
CO ppm 1-Hr Excess Emissions for 1/1/2014 thru 3/31/2014

| Parameter | Start | End | Duration | Value | Min | Max | Limit | Reason | Action |
|----------------|--------------------|----------|----------|--------|--------|---------|-------|--|---------------------------------------|
| CO ppm 1-Hr | 1/3/2014 10:00 AM | 11:59 AM | 2 hours | 915.00 | 828.70 | 1001.40 | 500 | CO ppm, CO ppm @ 0% O2, & CO lb/hr Emission Exceedance - Decreased total charge 1000 BPD due to unit pressure. Making adjustments for vacuum, on WGC surface condenser - Low Excess O2 | Adjusted Excess O2 |
| CO ppm 1-Hr | 1/10/2014 11:00 AM | 5:59 PM | 7 hours | 788.40 | 536.50 | 999.20 | 500 | CO ppm, ppm @ 0% O2, & Lb/Hr Emission Exceedance - Increasing Rates - Low Excess O2 | Adjusted Excess O2 |
| CO ppm 1-Hr | 3/2/2014 3:00 AM | 3:59 AM | 1 hour | 906.10 | 906.10 | 906.10 | 500 | Process Upset - Indeck Boilers #1 & #2 Shutdown | Stabilized Unit and Restarted Boilers |
| Total duration | | | 10 hours | | | | | | |

1Q14 FCCU CEMS

CO ppm

Form D – Downtime Summary

FCCU CEMS Downtime Summary
Frontier Refining LLC
CO ppm CEMS Downtime for 1/1/2014 thru 3/31/2014

| Reason | Duration |
|--|-------------------|
| CISCO Technician inadvertently triggered a calibration on the FCCU CEMS while working on the Crude Charge Heater CEMS causing the data to go OOC | 1 hour |
| CO Analyzer Malfunction - Data Invalid - Formula Input Out of Range - Low Excess O2 | 1 hour |
| CO Analyzer Malfunction - Low Excess O2 | 7 hours |
| Cylinder Gas Audit (CGA) | 1 hour |
| FCCU Down - Lost all Boilers | 1 hour |
| Unit Start-up - Analyzer Calibration Checks Failed | 11 hours |
| Total duration of CO ppm CEMS downtime | 22 hours |
| Total operating time | 1902 hours |
| Operating time with CEMS downtime | 1.2% |

FCCU CEMS Downtime
Frontier Refining LLC
CO ppm CEMS Downtime for 1/1/2014 thru 3/31/2014

| Parameter | Start | End | Duration | Reason | Action |
|----------------|--------------------|----------|----------|--|---|
| CO ppm | 1/3/2014 12:00 PM | 12:59 PM | 1 hour | CO Analyzer Malfunction - Data Invalid - Formula Input Out of Range - Low Excess O2 | Adjusted Excess O2 |
| CO ppm | 1/4/2014 7:00 AM | 11:59 AM | 5 hours | CO Analyzer Malfunction - Low Excess O2 | Adjusted Excess O2 |
| CO ppm | 1/5/2014 10:00 AM | 10:59 AM | 1 hour | CO Analyzer Malfunction - Low Excess O2 | Adjusted Excess O2 |
| CO ppm | 1/6/2014 9:00 AM | 9:59 AM | 1 hour | CO Analyzer Malfunction - Low Excess O2 | Adjusted Excess O2 |
| CO ppm | 1/21/2014 1:00 PM | 1:59 PM | 1 hour | CISCO Technician inadvertently triggered a calibration on the FCCU CEMS while working on the Crude Charge Heater CEMS causing the data to go OOC | Ran Manual Calibration |
| CO ppm | 2/5/2014 7:00 AM | 7:59 AM | 1 hour | FCCU Down - Lost all Boilers | Insufficient Data - <0.5 Hours of Valid Data - Restarted Unit |
| CO ppm | 2/16/2014 12:00 AM | 10:59 AM | 11 hours | Unit Start-up - Analyzer Calibration Checks Failed | Ran Manual Calibration |
| CO ppm | 3/20/2014 9:00 AM | 9:59 AM | 1 hour | Cylinder Gas Audit (CGA) | Performed NOx, SO2, CO & O2 CGA |
| Total duration | | | 22 hours | | |

1Q14

EXCESS EMISSION SUMMARY REPORT
FCCU CO (ppmvd) @ 0% O₂ (1-hr average) CEMS
1-hr average limit = 500 ppmvd @ 0% O₂

FORM B

| Emission Data Summary | | CMS Performance Report | |
|---|------|---|------|
| I. Duration of Excess Emission in Reporting Period Due to: | | I. CMS Downtime in Reporting Period Due to: | |
| A. Startup/Shutdown | 0.0 | A. Monitor Equipment Malfunction | 12.0 |
| B. Control Equipment Problems | 0.0 | B. Non-Monitor Equipment Malfunctions | 8.0 |
| C. Process Problem | 10.0 | C. Quality Assurance Calibration | 1.0 |
| D. Other Known Causes | 0.0 | D. Other Known Causes | 1.0 |
| E. Unknown Causes | 0.0 | E. Unknown Causes | 0.0 |
| II. Total Duration of Excess Emission | 10.0 | II. Total CMS Downtime | 22.0 |
| III. Total Duration of Excess Emissions x 100 divided by Total Source Operating Time minus Total CMS Downtime | 0.5% | III. Total CMS Downtime x 100 divided by Total Source Operating Time | 1.2% |

Total time of excess emission events due to emergency/abnormal operations: 0.

NOTE:

- Only report excess emissions which occur when the unit/process is operating. Include all excess emissions in the Emission Data Summary including those excess emissions associated with startup/shutdown and those excess emissions associated with Chapter 1 Section 5 (Emergency/Abnormal) operations. Report times in hours for gaseous monitors and in tenths of an hour for opacity monitors. Include detailed excess emission information and causes in the Excess Emission Table (Form C).
- Only report CEM downtime which occurs while the unit/process is operating. Report time in hours to one decimal point. Include detailed CEM downtime and causes in the Monitor Outage Table (Form D).
- Include an explanation of what corrective actions were taken for total excess emissions or monitor downtime for the quarter (Emission Data Summary and CMS Performance Summary, Item III) greater than 5%. (See Instructions for further details.)

1Q14

EXCESS EMISSION SUMMARY REPORT
FCCU CO (ppmvd) @ 0% O₂ (365-day rolling average) CEMS
365-day rolling average = 100 ppmvd @ 0% O₂

FORM B

| Emission Data Summary | | CMS Performance Report | |
|---|------|---|------|
| I. Duration of Excess Emission in Reporting Period Due to: | | I. CMS Downtime in Reporting Period Due to: | |
| A. Startup/Shutdown | 0.0 | A. Monitor Equipment Malfunction | 12.0 |
| B. Control Equipment Problems | 0.0 | B. Non-Monitor Equipment Malfunctions | 8.0 |
| C. Process Problem | 0.0 | C. Quality Assurance Calibration | 1.0 |
| D. Other Known Causes | 0.0 | D. Other Known Causes | 1.0 |
| E. Unknown Causes | 0.0 | E. Unknown Causes | 0.0 |
| II. Total Duration of Excess Emission | 0.0 | II. Total CMS Downtime | 22.0 |
| III. Total Duration of Excess Emissions x 100 divided by Total Source Operating Time minus Total CMS Downtime | 0.0% | III. Total CMS Downtime x 100 divided by Total Source Operating Time | 1.2% |

Total time of excess emission events due to emergency/abnormal operations: 0.

NOTE:

1. Only report excess emissions which occur when the unit/process is operating. Include all excess emissions in the Emission Data Summary including those excess emissions associated with startup/shutdown and those excess emissions associated with Chapter 1 Section 5 (Emergency/Abnormal) operations. Report times in hours for gaseous monitors and in tenths of an hour for opacity monitors. Include detailed excess emission information and causes in the Excess Emission Table (Form C).
2. Only report CEM downtime which occurs while the unit/process is operating. Report time in hours to one decimal point. Include detailed CEM downtime and causes in the Monitor Outage Table (Form D).
3. Include an explanation of what corrective actions were taken for total excess emissions or monitor downtime for the quarter (Emission Data Summary and CMS Performance Summary, Item III) greater than 5%. (See Instructions for further details.)
4. Rolling 7-day and 365-day averages are calculated for each day the emission source is operating, including days when the analyzer has downtime. A null value is used for days in a rolling average period where the unit is not operating or the CEMS downtime causes insufficient data for a valid daily average. This can result in a day where the data is considered to be both an excess emission and analyzer downtime.

1Q14 FCCU CEMS

CO ppm @ 0% O2

***Form C – Excess Emission
Summary***

FCCU Excess Emissions Summary

Frontier Refining LLC

CO ppm @0% O2 1-Hr Excess Emissions for 1/1/2014 thru 3/31/2014

| Reason | Duration |
|--|------------|
| CO ppm, CO ppm @ 0% O2, & CO lb/hr Emission Exceedance - Decreased total charge 1000 BPD due to unit pressure. Making adjustments for vacuum, on WGC surface condenser - Low Excess O2 | 2 hours |
| CO ppm, ppm @ 0% O2, & Lb/Hr Emission Exceedance - Increasing Rates - Low Excess O2 | 7 hours |
| Process Upset - Indeck Boilers #1 & #2 Shutdown | 1 hour |
| Total duration of CO ppm @0% O2 1-Hr excess emissions | 10 hours |
| Total operating time | 1902 hours |
| Operating time with excess emissions | 0.5% |

FCCU Excess Emissions

Frontier Refining LLC

CO ppm @0% O2 1-Hr Excess Emissions for 1/1/2014 thru 3/31/2014

| Parameter | Start | End | Duration | Value | Min | Max | Limit | Reason | Action |
|--------------------|--------------------|----------|----------|---------|---------|---------|-------|--|---------------------------------------|
| CO ppm @0% O2 1-Hr | 1/3/2014 10:00 AM | 11:59 AM | 2 hours | 924.40 | 838.30 | 1010.50 | 500 | CO ppm, CO ppm @ 0% O2, & CO lb/hr Emission Exceedance - Decreased total charge 1000 BPD due to unit pressure. Making adjustments for vacuum, on WGC surface condenser - Low Excess O2 | Adjusted Excess O2 |
| CO ppm @0% O2 1-Hr | 1/10/2014 11:00 AM | 5:59 PM | 7 hours | 797.20 | 548.70 | 1009.40 | 500 | CO ppm, ppm @ 0% O2, & Lb/Hr Emission Exceedance - Increasing Rates - Low Excess O2 | Adjusted Excess O2 |
| CO ppm @0% O2 1-Hr | 3/2/2014 3:00 AM | 3:59 AM | 1 hour | 1549.60 | 1549.60 | 1549.60 | 500 | Process Upset - Indeck Boilers #1 & #2 Shutdown | Stabilized Unit and Restarted Boilers |
| Total duration | | | 10 hours | | | | | | |

1Q14 FCCU CEMS

***CO ppm @ 0% O2
365-Day Rolling Average***

***Form C – Excess Emission
Summary***

FCCU Excess Emissions Summary

Frontier Refining LLC

CO ppm @0% O2 365-Day Rolling Excess Emissions for 1/1/2014 thru 3/31/2014

| Reason | Duration |
|--|-----------------|
| <i>There are no excess emissions for this report.</i> | |
| Total duration of CO ppm @0% O2 365-Day Rolling excess emissions | 0 |
| Total operating time | 1902 hours |
| Operating time with excess emissions | 0.0% |

1Q14 FCCU CEMS

CO ppm @ 0% O2

Form D – Downtime Summary

FCCU CEMS Downtime Summary

Frontier Refining LLC

CO ppm @0% O2 CEMS Downtime for 1/1/2014 thru 3/31/2014

| Reason | Duration |
|--|-------------------|
| CISCO Technician inadvertently triggered a calibration on the FCCU CEMS while working on the Crude Charge Heater CEMS causing the data to go OOC | 1 hour |
| CO Analyzer Malfunction - Data Invalid - Formula Input Out of Range - Low Excess O2 | 1 hour |
| CO Analyzer Malfunction - Low Excess O2 | 7 hours |
| Cylinder Gas Audit (CGA) | 1 hour |
| FCCU Down - Lost all Boilers | 1 hour |
| Unit Start-up - Analyzer Calibration Checks Failed | 11 hours |
| Total duration of CO ppm @0% O2 CEMS downtime | 22 hours |
| Total operating time | 1902 hours |
| Operating time with CEMS downtime | 1.2% |

FCCU CEMS Downtime
Frontier Refining LLC
CO ppm @0% O2 CEMS Downtime for 1/1/2014 thru 3/31/2014

| Parameter | Start | End | Duration | Reason | Action |
|----------------|--------------------|----------|----------|--|---|
| CO ppm @0% O2 | 1/3/2014 12:00 PM | 12:59 PM | 1 hour | CO Analyzer Malfunction - Data Invalid - Formula Input Out of Range - Low Excess O2 | Adjusted Excess O2 |
| CO ppm @0% O2 | 1/4/2014 7:00 AM | 11:59 AM | 5 hours | CO Analyzer Malfunction - Low Excess O2 | Adjusted Excess O2 |
| CO ppm @0% O2 | 1/5/2014 10:00 AM | 10:59 AM | 1 hour | CO Analyzer Malfunction - Low Excess O2 | Adjusted Excess O2 |
| CO ppm @0% O2 | 1/6/2014 9:00 AM | 9:59 AM | 1 hour | CO Analyzer Malfunction - Low Excess O2 | Adjusted Excess O2 |
| CO ppm @0% O2 | 1/21/2014 1:00 PM | 1:59 PM | 1 hour | CISCO Technician inadvertently triggered a calibration on the FCCU CEMS while working on the Crude Charge Heater CEMS causing the data to go OOC | Ran Manual Calibration |
| CO ppm @0% O2 | 2/5/2014 7:00 AM | 7:59 AM | 1 hour | FCCU Down - Lost all Boilers | Insufficient Data - <0.5 Hours of Valid Data - Restarted Unit |
| CO ppm @0% O2 | 2/16/2014 12:00 AM | 10:59 AM | 11 hours | Unit Start-up - Analyzer Calibration Checks Failed | Ran Manual Calibration |
| CO ppm @0% O2 | 3/20/2014 9:00 AM | 9:59 AM | 1 hour | Cylinder Gas Audit (CGA) | Performed NOx, SO2, CO & O2 CGA |
| Total duration | | | 22 hours | | |

1Q14

EXCESS EMISSION SUMMARY REPORT**FCCU CO (lb/hr) CEMS****1-hr average limit = 30 lb/hr****FORM B**

| Emission Data Summary | | CMS Performance Report | |
|--|-------------|---|-------------|
| I. Duration of Excess Emission in Reporting Period Due to: | | I. CMS Downtime in Reporting Period Due to: | |
| A. Startup/Shutdown | 0.0 | A. Monitor Equipment Malfunction | 13.0 |
| B. Control Equipment Problems | 0.0 | B. Non-Monitor Equipment Malfunctions | 8.0 |
| C. Process Problem | 9.0 | C. Quality Assurance Calibration | 1.0 |
| D. Other Known Causes | 0.0 | D. Other Known Causes | 2.0 |
| E. Unknown Causes | 0.0 | E. Unknown Causes | 0.0 |
| II. Total Duration of Excess Emission | 9.0 | II. Total CMS Downtime | 24.0 |
| III. Total Duration of Excess Emissions x 100 divided by Total Source Operating Time minus Total CMS Downtime | 0.5% | III. Total CMS Downtime x 100 divided by Total Source Operating Time | 1.3% |

Total time of excess emission events due to emergency/abnormal operations: 0 .

NOTE:

1. Only report excess emissions which occur when the unit/process is operating. Include all excess emissions in the Emission Data Summary including those excess emissions associated with startup/shutdown and those excess emissions associated with Chapter 1 Section 5 (Emergency/Abnormal) operations. Report times in hours for gaseous monitors and in tenths of an hour for opacity monitors. Include detailed excess emission information and causes in the Excess Emission Table (Form C).
2. Only report CEM downtime which occurs while the unit/process is operating. Report time in hours to one decimal point. Include detailed CEM downtime and causes in the Monitor Outage Table (Form D).
3. Include an explanation of what corrective actions were taken for total excess emissions or monitor downtime for the quarter (Emission Data Summary and CMS Performance Summary, Item III) greater than 5%. (See Instructions for further details.)

1Q14

EXCESS EMISSION SUMMARY REPORT**FCCU CO (lb/hr) CEMS****365-day rolling average = 18.2 lb/hr****FORM B**

| Emission Data Summary | | CMS Performance Report | |
|--|-------------|---|-------------|
| I. Duration of Excess Emission in Reporting Period Due to: | | I. CMS Downtime in Reporting Period Due to: | |
| A. Startup/Shutdown | 0.0 | A. Monitor Equipment Malfunction | 13.0 |
| B. Control Equipment Problems | 0.0 | B. Non-Monitor Equipment Malfunctions | 8.0 |
| C. Process Problem | 0.0 | C. Quality Assurance Calibration | 1.0 |
| D. Other Known Causes | 0.0 | D. Other Known Causes | 2.0 |
| E. Unknown Causes | 0.0 | E. Unknown Causes | 0.0 |
| II. Total Duration of Excess Emission | 0.0 | II. Total CMS Downtime | 24.0 |
| III. Total Duration of Excess Emissions x 100 divided by Total Source Operating Time minus Total CMS Downtime | 0.0% | III. Total CMS Downtime x 100 divided by Total Source Operating Time | 1.3% |

Total time of excess emission events due to emergency/abnormal operations: 0.**NOTE:**

1. Only report excess emissions which occur when the unit/process is operating. Include all excess emissions in the Emission Data Summary including those excess emissions associated with startup/shutdown and those excess emissions associated with Chapter 1 Section 5 (Emergency/Abnormal) operations. Report times in hours for gaseous monitors and in tenths of an hour for opacity monitors. Include detailed excess emission information and causes in the Excess Emission Table (Form C).
2. Only report CEM downtime which occurs while the unit/process is operating. Report time in hours to one decimal point. Include detailed CEM downtime and causes in the Monitor Outage Table (Form D).
3. Include an explanation of what corrective actions were taken for total excess emissions or monitor downtime for the quarter (Emission Data Summary and CMS Performance Summary, Item III) greater than 5%. (See Instructions for further details.)
4. Rolling 7-day and 365-day averages are calculated for each day the emission source is operating, including days when the analyzer has downtime. A null value is used for days in a rolling average period where the unit is not operating or the CEMS downtime causes insufficient data for a valid daily average. This can result in a day where the data is considered to be both an excess emission and analyzer downtime.

1Q14 FCCU CEMS

CO Lb/Hr

***Form C – Excess Emission
Summary***

FCCU Excess Emissions Summary

Frontier Refining LLC

CO lbs 1-Hr Excess Emissions for 1/1/2014 thru 3/31/2014

| Reason | Duration |
|--|-----------------|
| CO Lb/Hr Emission Exceedance - Low Excess O2 | 1 hour |
| CO ppm, CO ppm @ 0% O2, & CO lb/hr Emission Exceedance - Decreased total charge 1000 BPD due to unit pressure. Making adjustments for vacuum, on WGC surface condenser - Low Excess O2 | 2 hours |
| CO ppm, ppm @ 0% O2, & Lb/Hr Emission Exceedance - Increasing Rates - Low Excess O2 | 5 hours |
| Process Upset - Indeck Boilers #1 & #2 Shutdown | 1 hour |
| Total duration of CO lbs 1-Hr excess emissions | 9 hours |
| Total operating time | 1902 hours |
| Operating time with excess emissions | 0.5% |

FCCU Excess Emissions

Frontier Refining LLC

CO lbs 1-Hr Excess Emissions for 1/1/2014 thru 3/31/2014

| Parameter | Start | End | Duration | Value | Min | Max | Limit | Reason | Action |
|----------------|--------------------|----------|----------|-------|-------|-------|-------|---|---------------------------------------|
| CO lbs 1-Hr | 1/3/2014 9:00 AM | 10:59 AM | 2 hours | 35.3 | 32.4 | 38.1 | 30 | CO ppm, CO ppm @ 0% O ₂ , & CO lb/hr Emission Exceedance - Decreased total charge 1000 BPD due to unit pressure. Making adjustments for vacuum, on WGC surface condenser - Low Excess O ₂ | Adjusted Excess O ₂ |
| CO lbs 1-Hr | 1/10/2014 11:00 AM | 12:59 PM | 2 hours | 38.0 | 36.2 | 39.7 | 30 | CO ppm, ppm @ 0% O ₂ , & Lb/Hr Emission Exceedance - Increasing Rates - Low Excess O ₂ | Adjusted Excess O ₂ |
| CO lbs 1-Hr | 1/10/2014 3:00 PM | 5:59 PM | 3 hours | 41.0 | 39.3 | 42.2 | 30 | CO ppm, ppm @ 0% O ₂ , & Lb/Hr Emission Exceedance - Increasing Rates - Low Excess O ₂ | Adjusted Excess O ₂ |
| CO lbs 1-Hr | 1/22/2014 2:00 PM | 2:59 PM | 1 hour | 35.9 | 35.9 | 35.9 | 30 | CO Lb/Hr Emission Exceedance - Low Excess O ₂ | Adjusted Excess O ₂ |
| CO lbs 1-Hr | 3/2/2014 3:00 AM | 3:59 AM | 1 hour | 103.2 | 103.2 | 103.2 | 30 | Process Upset - Indeck Boilers #1 & #2 Shutdown | Stabilized Unit and Restarted Boilers |
| Total duration | | | 9 hours | | | | | | |

1Q14 FCCU CEMS

CO lb/hr

365-Day Rolling Average

***Form C – Excess Emission
Summary***

FCCU Excess Emissions Summary

Frontier Refining LLC

CO lbs/hr 365-Day Rolling Excess Emissions for 1/1/2014 thru 3/31/2014

| Reason | Duration |
|--|------------|
| <i>There are no excess emissions for this report.</i> | |
| Total duration of CO lbs/hr 365-Day Rolling excess emissions | 0 |
| Total operating time | 1802 hours |
| Operating time with excess emissions | 0.0% |

1Q14 FCCU CEMS

CO Lb/Hr

Form D – Downtime Summary

FCCU CEMS Downtime Summary
Frontier Refining LLC
CO lbs CEMS Downtime for 1/1/2014 thru 3/31/2014

| Reason | Duration |
|--|------------|
| CISCO Technician Inadvertently triggered a calibration on the FCCU CEMS while working on the Crude Charge Heater CEMS causing the data to go OOC | 1 hour |
| CO Analyzer Malfunction - Data Invalid - Formula Input Out of Range - Low Excess O2 | 1 hour |
| CO Analyzer Malfunction - Low Excess O2 | 7 hours |
| Cylinder Gas Audit (CGA) | 1 hour |
| FCCU Down - Lost all Boilers | 1 hour |
| Maintenance - High Stack Vacuum | 1 hour |
| Unit Start-up - Analyzer Calibration Checks Failed | 12 hours |
| <hr/> | |
| Total duration of CO lbs CEMS downtime | 24 hours |
| Total operating time | 1902 hours |
| Operating time with CEMS downtime | 1.3% |

FCCU CEMS Downtime
Frontier Refining LLC
CO lbs CEMS Downtime for 1/1/2014 thru 3/31/2014

| Parameter | Start | End | Duration | Reason | Action |
|----------------|--------------------|----------|----------|--|---|
| CO lbs | 1/3/2014 12:00 PM | 12:59 PM | 1 hour | CO Analyzer Malfunction - Data Invalid - Formula Input Out of Range - Low Excess O2 | Adjusted Excess O2 |
| CO lbs | 1/4/2014 7:00 AM | 11:59 AM | 5 hours | CO Analyzer Malfunction - Low Excess O2 | Adjusted Excess O2 |
| CO lbs | 1/5/2014 10:00 AM | 10:59 AM | 1 hour | CO Analyzer Malfunction - Low Excess O2 | Adjusted Excess O2 |
| CO lbs | 1/6/2014 9:00 AM | 9:59 AM | 1 hour | CO Analyzer Malfunction - Low Excess O2 | Adjusted Excess O2 |
| CO lbs | 1/8/2014 9:00 AM | 9:59 AM | 1 hour | Maintenance - High Stack Vacuum | Changed out sample filters both at the probe and the cabinet. Blew out sample line. |
| CO lbs | 1/21/2014 1:00 PM | 1:59 PM | 1 hour | CISCO Technician inadvertently triggered a calibration on the FCCU CEMS while working on the Crude Charge Heater CEMS causing the data to go OOC | Ran Manual Calibration |
| CO lbs | 2/5/2014 7:00 AM | 7:59 AM | 1 hour | FCCU Down - Lost all Boilers | Insufficient Data - <0.5 Hours of Valid Data - Restarted Unit |
| CO lbs | 2/16/2014 12:00 AM | 11:59 AM | 12 hours | Unit Start-up - Analyzer Calibration Checks Failed | Ran Manual Calibration |
| CO lbs | 3/20/2014 9:00 AM | 9:59 AM | 1 hour | Cylinder Gas Audit (CGA) | Performed NOx, SO2, CO & O2 CGA |
| Total duration | | | 24 hours | | |

1Q14

DEPARTMENT OF ENVIRONMENTAL QUALITY
AIR QUALITY DIVISION
CONTINUOUS EMISSION MONITORING REPORT

FORM A

I. GENERAL INFORMATION

- A. Facility Name: FRONTIER REFINING LLC
- B. Process Unit/Pollutant Monitored: PM MONITORING SYSTEM - FLUIDIZED CATALYTIC CRACKING UNIT (FCCU) REGENERATOR
- C. Applicable Permit Number or Regulation: Consent Decree, MD-9640, and MACT Subpart UUU
- D. Applicable Emission Limit: 70.8 lb/hr (3-hr average); 0.029 lb Ni/hr (1-hr average)

II. MONITOR INFORMATION Laser Hawk PM Monitor

- A. Date of Original Monitor Installation: May 2011
- B. Date of Latest Monitor Certification: December 2012 (Approved 4/22/2013)

C. Pollutant/Opacity Monitor

- 1. Manufacturer: Teledyne Instruments
- 2. Model Number: 360 PM Laser Hawk
- 3. Serial Number Main Chassis: 360085
- 4. Basis of Measurement (If Applicable - Wet or Dry): NA
- 5. Instrument Span, Range Value (Specify Units): NA

D. Diluent Monitor NONE

- 1. Type of Monitor: O₂ or CO₂ (circle one)
- 2. Manufacturer:
- 3. Model Number:
- 4. Serial Number Main Chassis
- 5. Basis of Measurement (If Applicable - Wet or Dry):
- 6. Instrument Span, Range Value (Specify Units):__

E. Flow Monitor NONE

- 1. Type of Instrument (i.e. S-type Pitot Tube):
- 2. Manufacturer:
- 3. Model Number: _
- 4. Serial Number Main Chassis:

F. Quality Assurance Data

- 1. QA Plan Date: 2/15/2013
- 2. QA Plan Approval Date: 4/22/2013

III. Operating/Monitoring Data

A. Quarter: 1 Year: 2014

B Total Hours in Reporting Period: 2160

C. Hours Unit Operated During the Reporting Period: 1902

Note: Include all unit operating time for the quarter including operating time associated with Startup/Shutdown and Chapter 1 Section 5 (Emergency/Abnormal) Operations. Report time in hours to one decimal place, i.e. 1902.8.

IV. Quarterly Audits/Monitoring System Modifications

A. Quarterly Audits
Type Audit: ACA

| | | |
|----------------------------|-----------------------|-------------|
| | <u>Date Conducted</u> | <u>Pass</u> |
| Pollutant/Opacity Monitor: | <u>3/19/2014</u> | <u>Yes</u> |

Equipment Replaced During Reporting Period: None.

Note: Only equipment replacements or modifications to the system that could affect the ability of the continuous monitoring system to comply with the associated Performance Specification shall be reported.

V. Report Contact

A. Name: David Weeks, Environmental Engineer

B. Phone Number: (307) 771-8827

1Q14

EXCESS EMISSION SUMMARY REPORT**FCCU PM (lb/hr) CEMS****3-hr average limit = 70.8 lb/hr****FORM B**

| Emission Data Summary | | CMS Performance Report | |
|--|-------------|---|-------------|
| I. Duration of Excess Emission in Reporting Period Due to: | | I. CMS Downtime in Reporting Period Due to: | |
| A. Startup/Shutdown | 0.0 | A. Monitor Equipment Malfunction | 28.0 |
| B. Control Equipment Problems | 0.0 | B. Non-Monitor Equipment Malfunctions | 0.0 |
| C. Process Problem | 0.0 | C. Quality Assurance Calibration | 0.0 |
| D. Other Known Causes | 0.0 | D. Other Known Causes | 0.0 |
| E. Unknown Causes | 0.0 | E. Unknown Causes | 0.0 |
| II. Total Duration of Excess Emission | 0.0 | II. Total CMS Downtime | 28.0 |
| III. Total Duration of Excess Emissions x 100 divided by Total Source Operating Time minus Total CMS Downtime | 0.0% | III. Total CMS Downtime x 100 divided by Total Source Operating Time | 1.5% |

Total time of excess emission events due to emergency/abnormal operations: 0.

NOTE:

1. Only report excess emissions which occur when the unit/process is operating. Include all excess emissions in the Emission Data Summary including those excess emissions associated with startup/shutdown and those excess emissions associated with Chapter 1 Section 5 (Emergency/Abnormal) operations. Report times in hours for gaseous monitors and in tenths of an hour for opacity monitors. Include detailed excess emission information and causes in the Excess Emission Table (Form C).
2. Only report CEM downtime which occurs while the unit/process is operating. Report time in hours to one decimal point. Include detailed CEM downtime and causes in the Monitor Outage Table (Form D).
3. Include an explanation of what corrective actions were taken for total excess emissions or monitor downtime for the quarter (Emission Data Summary and CMS Performance Summary, Item III) greater than 5%. (See Instructions for further details.)

1Q14 FCCU CEMS

PM Lb/Hr

3-Hour Rolling Average

***Form C – Excess Emission
Summary***

FCCU Excess Emissions Summary

Frontier Refining LLC

PM lbs 3-Hr Rolling Excess Emissions for 1/1/2014 thru 3/31/2014

| Reason | Duration |
|--|-----------------|
| <i>There are no excess emissions for this report.</i> | |
| Total duration of PM lbs 3-Hr Rolling excess emissions | 0 |
| Total operating time | 1902 hours |
| Operating time with excess emissions | 0.0% |

1Q14 FCCU CEMS

PM Lb/Hr

Form D – Downtime Summary

FCCU CEMS Downtime Summary
Frontier Refining LLC
PM lbs CEMS Downtime for 1/1/2014 thru 3/31/2014

| Reason | Duration |
|--|------------|
| Particulate Analyzer Fault | 18 hours |
| Unit Start-up - Analyzer Calibration Checks Failed | 12 hours |
| <hr/> | |
| Total duration of PM lbs CEMS downtime | 28 hours |
| Total operating time | 1902 hours |
| Operating time with CEMS downtime | 1.5% |

FCCU CEMS Downtime
Frontier Refining LLC
PM lbs CEMS Downtime for 1/1/2014 thru 3/31/2014

| Parameter | Start | End | Duration | Reason | Action |
|----------------|--------------------|----------|----------|--|---|
| PM lbs | 1/8/2014 7:00 AM | 8:59 AM | 2 hours | Particulate Analyzer Fault | Cleaned Lens and Ran Cal to Clear Alarm |
| PM lbs | 1/10/2014 8:00 AM | 8:59 AM | 1 hour | Particulate Analyzer Fault | Cleaned Lens and Ran Cal to Clear Alarm |
| PM lbs | 1/11/2014 7:00 AM | 9:59 AM | 3 hours | Particulate Analyzer Fault | Cleaned Lens and Ran Cal to Clear Alarm |
| PM lbs | 1/16/2014 7:00 AM | 7:59 AM | 1 hour | Particulate Analyzer Fault | Cleaned Lens and Ran Cal to Clear Alarm |
| PM lbs | 1/17/2014 7:00 AM | 8:59 AM | 2 hours | Particulate Analyzer Fault | Cleaned Lens and Ran Cal to Clear Alarm |
| PM lbs | 1/18/2014 7:00 AM | 7:59 AM | 1 hour | Particulate Analyzer Fault | Cleaned Lens and Ran Cal to Clear Alarm |
| PM lbs | 1/20/2014 7:00 AM | 8:59 AM | 2 hours | Particulate Analyzer Fault | Cleaned Lens and Ran Cal to Clear Alarm |
| PM lbs | 2/16/2014 12:00 AM | 11:59 AM | 12 hours | Unit Start-up - Analyzer Calibration Checks Failed | Ran Manual Calibration |
| PM lbs | 3/10/2014 7:00 AM | 8:59 AM | 2 hours | Particulate Analyzer Fault | Cleaned Lens and Ran Cal to Clear Alarm |
| PM lbs | 3/25/2014 7:00 AM | 7:59 AM | 1 hour | Particulate Analyzer Fault | Cleaned Lens and Ran Cal to Clear Alarm |
| PM lbs | 3/26/2014 7:00 AM | 7:59 AM | 1 hour | Particulate Analyzer Fault | Cleaned Lens and Ran Cal to Clear Alarm |
| Total duration | | | 28 hours | | |

1Q14

EXCESS EMISSION SUMMARY REPORT
FCCU PM (Ni lb/hr) CEMS
1-hr average limit = 0.029 lb/hr

FORM B

| Emission Data Summary | | CMS Performance Report | |
|--|-------------|---|-------------|
| I. Duration of Excess Emission in Reporting Period Due to: | | I. CMS Downtime in Reporting Period Due to: | |
| A. Startup/Shutdown | 0.0 | A. Monitor Equipment Malfunction | 28.0 |
| B. Control Equipment Problems | 0.0 | B. Non-Monitor Equipment Malfunctions | 0.0 |
| C. Process Problem | 0.0 | C. Quality Assurance Calibration | 0.0 |
| D. Other Known Causes | 0.0 | D. Other Known Causes | 0.0 |
| E. Unknown Causes | 0.0 | E. Unknown Causes | 0.0 |
| II. Total Duration of Excess Emission | 0.0 | II. Total CMS Downtime | 28.0 |
| III. Total Duration of Excess Emissions x 100 divided by Total Source Operating Time minus Total CMS Downtime | 0.0% | III. Total CMS Downtime x 100 divided by Total Source Operating Time | 1.5% |

Total time of excess emission events due to emergency/abnormal operations: 0 .

NOTE:

1. Only report excess emissions which occur when the unit/process is operating. Include all excess emissions in the Emission Data Summary including those excess emissions associated with startup/shutdown and those excess emissions associated with Chapter 1 Section 5 (Emergency/Abnormal) operations. Report times in hours for gaseous monitors and in tenths of an hour for opacity monitors. Include detailed excess emission information and causes in the Excess Emission Table (Form C).
2. Only report CEM downtime which occurs while the unit/process is operating. Report time in hours to one decimal point. Include detailed CEM downtime and causes in the Monitor Outage Table (Form D).
3. Include an explanation of what corrective actions were taken for total excess emissions or monitor downtime for the quarter (Emission Data Summary and CMS Performance Summary, Item III) greater than 5%. (See Instructions for further details.)

1Q14 FCCU CEMS

Ni Lb/Hr

***Form C – Excess Emission
Summary***

FCCU Excess Emissions Summary

Frontier Refining LLC

Nickle lbs 1-Hr Excess Emissions for 1/1/2014 thru 3/31/2014

| Reason | Duration |
|--|-----------------|
| <i>There are no excess emissions for this report.</i> | |
| Total duration of Nickle lbs 1-Hr excess emissions | 0 |
| Total operating time | 1902 hours |
| Operating time with excess emissions | 0.0% |

1Q14 FCCU CEMS

Ni Lb/Hr

Form D – Downtime Summary

FCCU CEMS Downtime Summary

Frontier Refining LLC

Nickel lbs CEMS Downtime for 1/1/2014 thru 3/31/2014

| Reason | Duration |
|---|-------------------|
| Particulate Analyzer Fault | 16 hours |
| Unit Start-up - Analyzer Calibration Checks Failed | 12 hours |
| Total duration of Nickel lbs CEMS downtime | 28 hours |
| Total operating time | 1902 hours |
| Operating time with CEMS downtime | 1.5% |

FCCU CEMS Downtime
Frontier Refining LLC
Nickel lbs CEMS Downtime for 1/1/2014 thru 3/31/2014

| Parameter | Start | End | Duration | Reason | Action |
|----------------|--------------------|----------|----------|--|---|
| Nickel lbs | 1/8/2014 7:00 AM | 8:59 AM | 2 hours | Particulate Analyzer Fault | Cleaned Lens and Ran Cal to Clear Alarm |
| Nickel lbs | 1/10/2014 8:00 AM | 8:59 AM | 1 hour | Particulate Analyzer Fault | Cleaned Lens and Ran Cal to Clear Alarm |
| Nickel lbs | 1/11/2014 7:00 AM | 9:59 AM | 3 hours | Particulate Analyzer Fault | Cleaned Lens and Ran Cal to Clear Alarm |
| Nickel lbs | 1/16/2014 7:00 AM | 7:59 AM | 1 hour | Particulate Analyzer Fault | Cleaned Lens and Ran Cal to Clear Alarm |
| Nickel lbs | 1/17/2014 7:00 AM | 8:59 AM | 2 hours | Particulate Analyzer Fault | Cleaned Lens and Ran Cal to Clear Alarm |
| Nickel lbs | 1/18/2014 7:00 AM | 7:59 AM | 1 hour | Particulate Analyzer Fault | Cleaned Lens and Ran Cal to Clear Alarm |
| Nickel lbs | 1/20/2014 7:00 AM | 8:59 AM | 2 hours | Particulate Analyzer Fault | Cleaned Lens and Ran Cal to Clear Alarm |
| Nickel lbs | 2/16/2014 12:00 AM | 11:59 AM | 12 hours | Unit Start-up - Analyzer Calibration Checks Failed | Ran Manual Calibration |
| Nickel lbs | 3/10/2014 7:00 AM | 8:59 AM | 2 hours | Particulate Analyzer Fault | Cleaned Lens and Ran Cal to Clear Alarm |
| Nickel lbs | 3/25/2014 7:00 AM | 7:59 AM | 1 hour | Particulate Analyzer Fault | Cleaned Lens and Ran Cal to Clear Alarm |
| Nickel lbs | 3/26/2014 7:00 AM | 7:59 AM | 1 hour | Particulate Analyzer Fault | Cleaned Lens and Ran Cal to Clear Alarm |
| Total duration | | | 28 hours | | |

Data Sheet for FCCU PM CEM System Absolute Correlation Audit (ACA)

Date: March 19, 2014

Time: 9:50 A.M.

| | Zero % | Low | Mid | 100% |
|--------------------|----------|----------|----------|----------|
| | Analyzer | Analyzer | Analyzer | Analyzer |
| Run 1 | 0.02 | 57.37 | 78.57 | 100.30 |
| Run 2 | 0.01 | 57.93 | 79.21 | 101.10 |
| Run 3 | 0.04 | 58.40 | 79.67 | 101.40 |
| C_{CEM}, R_{CEM} | (1.15) | 57.90 | 79.15 | 100.93 |
| C_{RV}, R_V | 0.00 | 58.00 | 79.30 | 100.00 |
| ACA Accuracy | 1.63 | 0.17 | 0.19 | 0.93 |
| Pass? | Yes | Yes | Yes | Yes |

Signature of Technician(s) performing ACA:



Matt Hobbs, Kevin Marschner and/or Tad Milliken

Calculation of ACA Accuracy:

For Low, Mid & 100% :

Eq. 2-1a $ACA = (R_{CEM} - R_V) / R_V \times 100$

ACA must be +/-10% to pass.

where:

ACA = accuracy of CEM, %
 R_{CEM} = average of responses
 R_V = certified audit value of gas

For Zero:

Eq. 2-1b $ACA = (C_{CEM} - C_{RV}) / C_S \times 100$

ACA must be +/-7.5% to pass.

where:

ACA = accuracy of CEM, %
 C_{CEM} = average of responses
 C_{RV} = certified audit value of gas
 $Y \text{ (mg/m}^3\text{)} = 6.4 \times X \text{ (backscatter in \%)} - 1.3$

Data Sheet for FCCU CEM System Cylinder Gas Audit

1. Date Audit Commenced: 2014.03.20 Time Audit Commenced: 0930 thru 1125

2. Audit Gases Used for CGA (All gases to be Protocol 1 Certified):

| Acceptable Audit Gas Ranges | Cylinder Number and Expiration Date | Audit Gas Concentrations | | +/- of Audit Gas Range |
|--|--|-----------------------------|-----|---------------------------|
| NO_x Low: 80 - 120 ppm | CC420619 | 100.7 | ppm | 25.18% |
| | 20-Feb-21 | | | |
| NO_x Mid: 200 - 240 ppm | CC363979 | 223 | ppm | 55.75% |
| | 28-Feb-21 | | | |
| SO_x Low: 240 - 360 ppm | CC420619 | 300.7 | ppm | 25.06% |
| | 28-Feb-21 | | | |
| SO_x Mid: 600 - 720 ppm | CC363979 | 655.9 | ppm | 54.66% |
| | 25-Feb-21 | | | |
| CO Low: 200 - 300 ppm | CC420619 | 251.2 | ppm | 25.12% |
| | 28-Feb-21 | | | |
| CO Mid: 500 - 600 ppm | CC363979 | 553.9 | ppm | 55.39% |
| | 28-Feb-21 | | | |
| O₂ Low: 4 - 6% by volume | CC94180 | 6.22 | % | 24.88% |
| | 16-Feb-21 | | | |
| O₂ Mid: 8 - 12% by volume | CC234478 | 13.67 | % | 54.68% |
| | 27-Feb-21 | | | |
| CO₂ Low: 5 - 8% by volume | CC94180 | 4.96 | % | 24.80% |
| | 16-Feb-21 | | | |
| CO₂ Mid: 10 - 14% by volume | CC234478 | 10.97 | % | 54.85% |
| | 27-Feb-21 | | | |

Data Sheet for FCCU CEM System Cylinder Gas Audit

Date: 2014.03.20

3. CEM System Response:

| | Low-Span NO _x | | Mid-Span NO _x | | Low-Span SO ₂ | | Mid-Span SO ₂ | |
|------------------------|--------------------------|--------|--------------------------|--------|--------------------------|--------|--------------------------|--------|
| | Analyzer | CISCO | Analyzer | CISCO | Analyzer | CISCO | Analyzer | CISCO |
| Run 1 | 108.58 | 108.43 | 241.40 | 241.59 | 292.41 | 292.19 | 653.40 | 653.12 |
| Run 2 | 108.57 | 108.42 | 241.88 | 242.06 | 293.83 | 293.66 | 658.51 | 657.77 |
| Run 3 | 109.05 | 108.95 | 241.85 | 242.13 | 297.96 | 297.75 | 664.49 | 663.78 |
| Avg. (d _m) | 108.73 | 108.60 | 241.71 | 241.93 | 294.73 | 294.53 | 658.80 | 658.22 |
| A | 7.98 | 7.85 | 8.39 | 8.49 | 1.98 | 2.05 | 0.44 | 0.35 |
| Pass? | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |

| | Low-Span CO | | Mid-Span CO | |
|------------------------|-------------|--------|-------------|--------|
| | Analyzer | CISCO | Analyzer | CISCO |
| Run 1 | 257.35 | 257.35 | 540.13 | 539.61 |
| Run 2 | 257.29 | 257.04 | 540.63 | 539.86 |
| Run 3 | 257.22 | 257.08 | 540.57 | 539.84 |
| Avg. (d _m) | 257.29 | 257.16 | 540.44 | 539.77 |
| A | 2.42 | 2.37 | 2.43 | 2.55 |
| Pass? | Yes | Yes | Yes | Yes |

4. Signature of Technician(s) performing CGA:



Matt Hobbs, Kevin Marschner and/or Tad Milliken

Calculation of A:

$$A = (d_m - c_a) / c_a \times 100$$

A must be +/-15% to pass.

where:

A = accuracy of CEM

d_m = average of responses

c_a = certified audit value of gas

Data Sheet for FCCU CEM System Cylinder Gas Audit

Date: 2014.03.20

3. CEM System Response:

| | Low-Span O ₂ | | Mid-Span O ₂ | | Low-Span CO ₂ | | Mid-Span CO ₂ | |
|------------------------|-------------------------|-------|-------------------------|-------|--------------------------|-------|--------------------------|-------|
| | Analyzer | CISCO | Analyzer | CISCO | Analyzer | CISCO | Analyzer | CISCO |
| Run 1 | 6.41 | 6.42 | 13.95 | 13.96 | 5.14 | 5.13 | 10.67 | 10.64 |
| Run 2 | 6.42 | 6.44 | 13.95 | 13.97 | 5.14 | 5.13 | 10.70 | 10.65 |
| Run 3 | 6.43 | 6.44 | 13.97 | 13.99 | 5.11 | 5.10 | 10.68 | 10.65 |
| Avg. (d _m) | 6.42 | 6.43 | 13.96 | 13.97 | 5.13 | 5.12 | 10.68 | 10.65 |
| A | 3.22 | 3.43 | 2.10 | 2.22 | 3.43 | 3.23 | 2.61 | 2.95 |
| Pass? | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |

4. Signature of Technician(s) performing CGA:



Matt Hobbs, Kevin Marschner and/or Tad Milliken

Calculation of A:

$$A = (d_m - c_a) / c_a \times 100$$

A must be +/-15% to pass.

where:

A = accuracy of CEM

d_m = average of responses

c_a = certified audit value of gas

2Q14

DEPARTMENT OF ENVIRONMENTAL QUALITY
AIR QUALITY DIVISION
CONTINUOUS EMISSION MONITORING REPORT

FORM A

I. GENERAL INFORMATION

- A. Facility Name: FRONTIER REFINING LLC
B. Process Unit/Pollutant Monitored: NO_x MONITORING SYSTEM - FLUIDIZED CATALYTIC CRACKING UNIT (FCCU) REGENERATOR
C. Applicable Permit Number or Regulation: Consent Decree, MD-9640
D. Applicable Emission Limit: 21.9 lb/hr (7-day rolling average); 10.9 lb/hr (365-day rolling average); 120 ppmvd @ 0% O₂ (7-day rolling average); 60ppmvd @ 0% O₂ (365-day rolling average)

II. MONITOR INFORMATION

- A. Date of Original Monitor Installation: 6/5/2012
B. Date of Latest Monitor Certification: 7/17/2012

C. Pollutant/Opacity Monitor

1. Manufacturer: Teledyne/API
2. Model Number: Model 200H
3. Serial Number Main Chassis: 82
4. Basis of Measurement (If Applicable - Wet or Dry): Dry
5. Instrument Span, Range Value (Specify Units): 0-600 ppm and 0-150 lb/hr

D. Diluent Monitor **NONE**

1. Type of Monitor: O₂ or CO₂ (circle one)
2. Manufacturer:
3. Model Number:
4. Serial Number Main Chassis
5. Basis of Measurement (If Applicable - Wet or Dry):
6. Instrument Span, Range Value (Specify Units): _____

E. Flow Monitor

1. Type of Instrument (i.e. S-type Pitot Tube): S-Type Pitot Tube
2. Manufacturer: Dieterich Standard
3. Model Number: PSF-S4H HSVH FADH0 FADC
4. Serial Number Main Chassis: DFCH CEM 1MN 2XX #MN 4MN P1 ES RB TR AR YX ZS DB

F. Quality Assurance Data

1. QA Plan Date: 10/15/2012
2. QA Plan Approval Date: 4/22/2013

III. Operating/Monitoring Data

A. Quarter: 2 Year: 2014

B Total Hours in Reporting Period: 2184

C. Hours Unit Operated During the Reporting Period: 2015

Note: Include all unit operating time for the quarter including operating time associated with Startup/Shutdown and Chapter 1 Section 5 (Emergency/Abnormal) Operations. Report time in hours to one decimal place, i.e. 1902.8.

IV. Quarterly Audits/Monitoring System Modifications

A. Quarterly Audits
Type Audit: RATA

| | <u>Date Conducted</u> | <u>Pass</u> |
|----------------------------|-----------------------|-------------|
| Pollutant/Opacity Monitor: | <u>5/13/2014</u> | <u>YES</u> |

Note: A copy of the quarterly audits shall be included with the corresponding quarterly excess emission report.

Equipment Replaced During Reporting Period: Changed out Filters; Replaced Flow Pressure Transducer.

Note: Only equipment replacements or modifications to the system that could affect the ability of the continuous monitoring system to comply with the associated Performance Specification shall be reported.

V. Report Contact

A. Name: David Weeks, Environmental Engineer

B. Phone Number: (307) 771-8827

2Q14

EXCESS EMISSION SUMMARY REPORT**FCCU NO_x (lb/hr) CEMS****7-day rolling average = 21.9 lb/hr****FORM B**

| Emission Data Summary | | CMS Performance Report | |
|--|-------------|---|-------------|
| I. Duration of Excess Emission in Reporting Period Due to: | | I. CMS Downtime in Reporting Period Due to: | |
| A. Startup/Shutdown | 0.0 | A. Monitor Equipment Malfunction | 14.0 |
| B. Control Equipment Problems | 0.0 | B. Non-Monitor Equipment Malfunctions | 8.0 |
| C. Process Problem | 0.0 | C. Quality Assurance Calibration | 0.0 |
| D. Other Known Causes | 0.0 | D. Other Known Causes | 0.0 |
| E. Unknown Causes | 0.0 | E. Unknown Causes | 0.0 |
| II. Total Duration of Excess Emission | 0.0 | II. Total CMS Downtime | 22.0 |
| III. Total Duration of Excess Emissions x 100 divided by Total Source Operating Time minus Total CMS Downtime | 0.0% | III. Total CMS Downtime x 100 divided by Total Source Operating Time | 1.1% |

Total time of excess emission events due to emergency/abnormal operations: 0.**NOTE:**

1. Only report excess emissions which occur when the unit/process is operating. Include all excess emissions in the Emission Data Summary including those excess emissions associated with startup/shutdown and those excess emissions associated with Chapter 1 Section 5 (Emergency/Abnormal) operations. Report times in hours for gaseous monitors and in tenths of an hour for opacity monitors. Include detailed excess emission information and causes in the Excess Emission Table (Form C).
2. Only report CEM downtime which occurs while the unit/process is operating. Report time in hours to one decimal point. Include detailed CEM downtime and causes in the Monitor Outage Table (Form D).
3. Include an explanation of what corrective actions were taken for total excess emissions or monitor downtime for the quarter (Emission Data Summary and CMS Performance Summary, Item III) greater than 5%. (See Instructions for further details.)
4. Rolling 7-day and 365-day averages are calculated for each day the emission source is operating, including days when the analyzer has downtime. A null value is used for days in a rolling average period where the unit is not operating or the CEMS downtime causes insufficient data for a valid daily average. This can result in a day where the data is considered to be both an excess emission and analyzer downtime.

2Q14

EXCESS EMISSION SUMMARY REPORT
FCCU NO_x (lb/hr) CEMS
365-day rolling average = 10.9 lb/hr

FORM B

| Emission Data Summary | | CMS Performance Report | |
|---|------|---|------|
| I. Duration of Excess Emission in Reporting Period Due to: | | I. CMS Downtime in Reporting Period Due to: | |
| A. Startup/Shutdown | 0.0 | A. Monitor Equipment Malfunction | 14.0 |
| B. Control Equipment Problems | 0.0 | B. Non-Monitor Equipment Malfunctions | 8.0 |
| C. Process Problem | 0.0 | C. Quality Assurance Calibration | 0.0 |
| D. Other Known Causes | 0.0 | D. Other Known Causes | 0.0 |
| E. Unknown Causes | 0.0 | E. Unknown Causes | 0.0 |
| II. Total Duration of Excess Emission | 0.0 | II. Total CMS Downtime | 22.0 |
| III. Total Duration of Excess Emissions x 100 divided by Total Source Operating Time minus Total CMS Downtime | 0.0% | III. Total CMS Downtime x 100 divided by Total Source Operating Time | 1.1% |

Total time of excess emission events due to emergency/abnormal operations: 0.

NOTE:

1. Only report excess emissions which occur when the unit/process is operating. Include all excess emissions in the Emission Data Summary including those excess emissions associated with startup/shutdown and those excess emissions associated with Chapter 1 Section 5 (Emergency/Abnormal) operations. Report times in hours for gaseous monitors and in tenths of an hour for opacity monitors. Include detailed excess emission information and causes in the Excess Emission Table (Form C).
2. Only report CEM downtime which occurs while the unit/process is operating. Report time in hours to one decimal point. Include detailed CEM downtime and causes in the Monitor Outage Table (Form D).
3. Include an explanation of what corrective actions were taken for total excess emissions or monitor downtime for the quarter (Emission Data Summary and CMS Performance Summary, Item III) greater than 5%. (See Instructions for further details.)
4. Rolling 7-day and 365-day averages are calculated for each day the emission source is operating, including days when the analyzer has downtime. A null value is used for days in a rolling average period where the unit is not operating or the CEMS downtime causes insufficient data for a valid daily average. This can result in a day where the data is considered to be both an excess emission and analyzer downtime.

FCCU Excess Emissions Summary

Frontier Refining LLC

NOx lbs 7-Day Rolling Excess Emissions for 4/1/2014 thru 6/30/2014

| Reason | Duration |
|--|------------|
| <i>There are no excess emissions for this report.</i> | |
| Total duration of NOx lbs 7-Day Rolling excess emissions | 0 |
| Total operating time | 2015 hours |
| Operating time with excess emissions | 0.0% |

Comment: Form C - Excess Emissions Summary

FCCU Excess Emissions Summary

Frontier Refining LLC

NOx lbs 365-Day Rolling Excess Emissions for 4/1/2014 thru 6/30/2014

| Reason | Duration |
|--|------------|
| <i>There are no excess emissions for this report.</i> | |
| Total duration of NOx lbs 365-Day Rolling excess emissions | 0 |
| Total operating time | 2015 hours |
| Operating time with excess emissions | 0.0% |

Comment: Form C - Excess Emissions Summary

FCCU CEMS Downtime Summary

Frontier Refining LLC

NOx lbs CEMS Downtime for 4/1/2014 thru 6/30/2014

| Reason | Duration |
|--|-----------------|
| Maintenance - Following Upset of FCCU due to Boiler #1 & #2 Shutdown - Sample System | 13 hours |
| Maintenance - Sample System | 1 hour |
| Process - Ran Low Excess O2 - Wet O2 > Dry O2 causing % Moisture and Lb/Hr to be Invalid | 7 hours |
| Process - Ran Low Excess O2 - Wet O2 > Dry O2 causing % Moisture, Dry Stack Flow and Lb/Hr to be Invalid | 1 hour |
| <hr/> | |
| Total duration of NOx lbs CEMS downtime | 22 hours |
| Total operating time | 2015 hours |
| Operating time with CEMS downtime | 1.1% |

Comment: Form D - Downtime Summary

FCCU CEMS Downtime
Frontier Refining LLC
NOx lbs CEMS Downtime for 4/1/2014 thru 6/30/2014

| Parameter | Start | End | Duration | Reason | Action |
|----------------|--------------------|----------|----------|--|--|
| NOx lbs | 4/11/2014 7:00 AM | 7:59 AM | 1 hour | Maintenance - Sample System | Took stack out of service to clean and change filters and service sample dryer. Passed Manual Calibration. |
| NOx lbs | 6/13/2014 10:00 AM | 10:59 PM | 13 hours | Maintenance - Following Upset of FCCU due to Boiler #1 & #2 Shutdown - Sample System | Cleaned sample probe filter |
| NOx lbs | 6/13/2014 11:00 PM | 11:59 PM | 1 hour | Process - Ran Low Excess O2 - Wet O2 > Dry O2 causing % Moisture and Lb/Hr to be Invalid | Adjusted Excess O2. Morning Calibration Check Corrected Discrepancy. |
| NOx lbs | 6/14/2014 12:00 AM | 5:59 AM | 6 hours | Process - Ran Low Excess O2 - Wet O2 > Dry O2 causing % Moisture and Lb/Hr to be Invalid | Adjusted Excess O2. Morning Calibration Check Corrected Discrepancy. |
| NOx lbs | 6/23/2014 10:00 PM | 10:59 PM | 1 hour | Process - Ran Low Excess O2 - Wet O2 > Dry O2 causing % Moisture, Dry Stack Flow and Lb/Hr to be Invalid | FCCU Shutdown |
| Total duration | | | 22 hours | | |

Comment: Form D - Downtime Summary

2Q14

EXCESS EMISSION SUMMARY REPORT
FCCU NOx (ppm) CEMS
7-day Rolling Average = 120 ppmvd @ 0% O₂

FORM B

| Emission Data Summary | | CMS Performance Report | |
|--|-------------|---|-------------|
| I. Duration of Excess Emission in Reporting Period Due to: | | I. CMS Downtime in Reporting Period Due to: | |
| A. Startup/Shutdown | 0.0 | A. Monitor Equipment Malfunction | 14.0 |
| B. Control Equipment Problems | 0.0 | B. Non-Monitor Equipment Malfunctions | 0.0 |
| C. Process Problem | 0.0 | C. Quality Assurance Calibration | 0.0 |
| D. Other Known Causes | 0.0 | D. Other Known Causes | 0.0 |
| E. Unknown Causes | 0.0 | E. Unknown Causes | 0.0 |
| II. Total Duration of Excess Emission | 0.0 | II. Total CMS Downtime | 14.0 |
| III. Total Duration of Excess Emissions x 100 divided by Total Source Operating Time minus Total CMS Downtime | 0.0% | III. Total CMS Downtime x 100 divided by Total Source Operating Time | 0.7% |

Total time of excess emission events due to emergency/abnormal operations: 0.

NOTE:

- Only report excess emissions which occur when the unit/process is operating. Include all excess emissions in the Emission Data Summary including those excess emissions associated with startup/shutdown and those excess emissions associated with Chapter 1 Section 5 (Emergency/Abnormal) operations. Report times in hours for gaseous monitors and in tenths of an hour for opacity monitors. Include detailed excess emission information and causes in the Excess Emission Table (Form C).
- Only report CEM downtime which occurs while the unit/process is operating. Report time in hours to one decimal point. Include detailed CEM downtime and causes in the Monitor Outage Table (Form D).
- Include an explanation of what corrective actions were taken for total excess emissions or monitor downtime for the quarter (Emission Data Summary and CMS Performance Summary, Item III) greater than 5%. (See Instructions for further details.)
- Rolling 7-day and 365-day averages are calculated for each day the emission source is operating, including days when the analyzer has downtime. A null value is used for days in a rolling average period where the unit is not operating or the CEMS downtime causes insufficient data for a valid daily average. This can result in a day where the data is considered to be both an excess emission and analyzer downtime.

2Q14

EXCESS EMISSION SUMMARY REPORT
FCCU NO_x (ppm) CEMS
365-day rolling average = 60 ppmvd @ 0% O₂

FORM B

| Emission Data Summary | | CMS Performance Report | |
|--|-------------|---|-------------|
| I. Duration of Excess Emission in Reporting Period Due to: | | I. CMS Downtime in Reporting Period Due to: | |
| A. Startup/Shutdown | 0.0 | A. Monitor Equipment Malfunction | 14.0 |
| B. Control Equipment Problems | 0.0 | B. Non-Monitor Equipment Malfunctions | 0.0 |
| C. Process Problem | 0.0 | C. Quality Assurance Calibration | 0.0 |
| D. Other Known Causes | 0.0 | D. Other Known Causes | 0.0 |
| E. Unknown Causes | 0.0 | E. Unknown Causes | 0.0 |
| II. Total Duration of Excess Emission | 0.0 | II. Total CMS Downtime | 14.0 |
| III. Total Duration of Excess Emissions x 100 divided by Total Source Operating Time minus Total CMS Downtime | 0.0% | III. Total CMS Downtime x 100 divided by Total Source Operating Time | 0.7% |

Total time of excess emission events due to emergency/abnormal operations: 0.

NOTE:

1. Only report excess emissions which occur when the unit/process is operating. Include all excess emissions in the Emission Data Summary including those excess emissions associated with startup/shutdown and those excess emissions associated with Chapter 1 Section 5 (Emergency/Abnormal) operations. Report times in hours for gaseous monitors and in tenths of an hour for opacity monitors. Include detailed excess emission information and causes in the Excess Emission Table (Form C).
2. Only report CEM downtime which occurs while the unit/process is operating. Report time in hours to one decimal point. Include detailed CEM downtime and causes in the Monitor Outage Table (Form D).
3. Include an explanation of what corrective actions were taken for total excess emissions or monitor downtime for the quarter (Emission Data Summary and CMS Performance Summary, Item III) greater than 5%. (See Instructions for further details.)
4. Rolling 7-day and 365-day averages are calculated for each day the emission source is operating, including days when the analyzer has downtime. A null value is used for days in a rolling average period where the unit is not operating or the CEMS downtime causes insufficient data for a valid daily average. This can result in a day where the data is considered to be both an excess emission and analyzer downtime.

FCCU Excess Emissions Summary

Frontier Refining LLC

NOx ppm @0% O2 7-Day Rolling Excess Emissions for 4/1/2014 thru 6/30/2014

| Reason | Duration |
|---|------------|
| <i>There are no excess emissions for this report.</i> | |
| Total duration of NOx ppm @0% O2 7-Day Rolling excess emissions | 0 |
| Total operating time | 2015 hours |
| Operating time with excess emissions | 0.0% |

Comment: Form C - Excess Emissions Summary

FCCU Excess Emissions Summary

Frontier Refining LLC

NOx ppm @0% O2 365-Day Rolling Excess Emissions for 4/1/2014 thru 6/30/2014

| Reason | Duration |
|---|-----------------|
| <i>There are no excess emissions for this report.</i> | |
| Total duration of NOx ppm @0% O2 365-Day Rolling excess emissions | 0 |
| Total operating time | 2016 hours |
| Operating time with excess emissions | 0.0% |

Comment: Form C - Excess Emissions Summary

FCCU CEMS Downtime Summary

Frontier Refining LLC

NOx ppm @0% O2 CEMS Downtime for 4/1/2014 thru 6/30/2014

| Reason | Duration |
|---|-------------------|
| Maintenance - Following Upset of FCCU due to Boiler #1 & #2 Shutdown - Sample System | 13 hours |
| Maintenance - Sample System | 1 hour |
| Total duration of NOx ppm @0% O2 CEMS downtime | 14 hours |
| Total operating time | 2015 hours |
| Operating time with CEMS downtime | 0.7% |

Comment: Form D - Downtime Summary

FCCU CEMS Downtime

Frontier Refining LLC

NOx ppm @0% O2 CEMS Downtime for 4/1/2014 thru 6/30/2014

| Parameter | Start | End | Duration | Reason | Action |
|----------------|--------------------|----------|----------|--|--|
| NOx ppm @0% O2 | 4/11/2014 7:00 AM | 7:59 AM | 1 hour | Maintenance - Sample System | Took stack out of service to clean and change filters and service sample dryer. Passed Manual Calibration. |
| NOx ppm @0% O2 | 6/13/2014 10:00 AM | 10:59 PM | 13 hours | Maintenance - Following Upset of FCCU due to Boiler #1 & #2 Shutdown - Sample System | Cleaned sample probe filter |
| Total duration | | | 14 hours | | |

Comment: Form D - Downtime Summary

2Q14

DEPARTMENT OF ENVIRONMENTAL QUALITY
AIR QUALITY DIVISION
CONTINUOUS EMISSION MONITORING REPORT

FORM A

I. GENERAL INFORMATION

- A. Facility Name: FRONTIER REFINING LLC
B. Process Unit/Pollutant Monitored: SO₂ MONITORING SYSTEM - FLUIDIZED CATALYTIC CRACKING UNIT (FCCU) REGENERATOR
C. Applicable Permit Number or Regulation: MD-946
D. Applicable Emission Limit: 320 lb/hr SO₂ (1-hr average); 1401.6 tpy (calendar year)

II. MONITOR INFORMATION

A. Date of Original Monitor Installation: 6/5/2012

B. Date of Latest Monitor Certification: 7/17/2012

C. Pollutant/Opacity Monitor

1. Manufacturer: Teledyne/API
2. Model Number: Model 100H
3. Serial Number Main Chassis: 71
4. Basis of Measurement (If Applicable - Wet or Dry): Dry
5. Instrument Span, Range Value (Specify Units): 0-1800 ppm and 0-600 lb/hr

D. Diluent Monitor NONE

1. Type of Monitor: O₂ or CO₂ (circle one)
2. Manufacturer:
3. Model Number:
4. Serial Number Main Chassis
5. Basis of Measurement (If Applicable - Wet or Dry):
6. Instrument Span, Range Value (Specify Units): _____

E. Flow Monitor

1. Type of Instrument (i.e. S-type Pitot Tube): S-Type Pitot Tube
2. Manufacturer: Dieterich Standard
3. Model Number: PSF-S4H HSVH FADH0 FADC
4. Serial Number Main Chassis: DFCII CEM 1MN 2XX #MN 4MN P1 ES RB TR AR YX ZS DB

F. Quality Assurance Data

1. QA Plan Date: 10/15/2012
2. QA Plan Approval Date: 4/22/2013

III. Operating/Monitoring Data

A. Quarter: 2 Year: 2014

B Total Hours in Reporting Period: 2184

C. Hours Unit Operated During the Reporting Period: 2015

Note: Include all unit operating time for the quarter including operating time associated with Startup/Shutdown and Chapter 1 Section 5 (Emergency/Abnormal) Operations. Report time in hours to one decimal place, i.e. 1902.8.

IV. Quarterly Audits/Monitoring System Modifications

A. Quarterly Audits
Type Audit: RATA

| | | |
|----------------------------|-----------------------|-------------|
| | <u>Date Conducted</u> | <u>Pass</u> |
| Pollutant/Opacity Monitor: | <u>5/13/2014</u> | <u>YES</u> |

Note: A copy of the quarterly audits shall be included with the corresponding quarterly excess emission report.

Equipment Replaced During Reporting Period: Changed out Filters; Replaced SO2 Flow Pressure Transducer Sensor.

Note: Only equipment replacements or modifications to the system that could affect the ability of the continuous monitoring system to comply with the associated Performance Specification shall be reported.

V. Report Contact

A. Name: David Weeks, Environmental Engineer

B. Phone Number: (307) 771-8827

2Q14

EMISSION SUMMARY REPORT
FCCU SO₂ (lb/hr) CEMS
1-hr average = 320 lb/hr

FORM B

| Emission Data Summary | | CMS Performance Report | |
|--|-------------|---|-------------|
| I. Duration of Excess Emission in Reporting Period Due to: | | I. CMS Downtime in Reporting Period Due to: | |
| A. Startup/Shutdown | 0.0 | A. Monitor Equipment Malfunction | 41.0 |
| B. Control Equipment Problems | 0.0 | B. Non-Monitor Equipment Malfunctions | 8.0 |
| C. Process Problem | 0.0 | C. Quality Assurance Calibration | 0.0 |
| D. Other Known Causes | 0.0 | D. Other Known Causes | 0.0 |
| E. Unknown Causes | 0.0 | E. Unknown Causes | 0.0 |
| II. Total Duration of Excess Emission | 0.0 | II. Total CMS Downtime | 49.0 |
| III. Total Duration of Excess Emissions x 100 divided by Total Source Operating Time minus Total CMS Downtime | 0.0% | III. Total CMS Downtime x 100 divided by Total Source Operating Time | 2.4% |

Total time of excess emission events due to emergency/abnormal operations: 0.

NOTE:

1. Only report excess emissions which occur when the unit/process is operating. Include all excess emissions in the Emission Data Summary including those excess emissions associated with startup/shutdown and those excess emissions associated with Chapter 1 Section 5 (Emergency/Abnormal) operations. Report times in hours for gaseous monitors and in tenths of an hour for opacity monitors. Include detailed excess emission information and causes in the Excess Emission Table (Form C).
2. Only report CEM downtime which occurs while the unit/process is operating. Report time in hours to one decimal point. Include detailed CEM downtime and causes in the Monitor Outage Table (Form D).
3. Include an explanation of what corrective actions were taken for total excess emissions or monitor downtime for the quarter (Emission Data Summary and CMS Performance Summary, Item III) greater than 5%. (See Instructions for further details.)

FCCU Excess Emissions Summary

Frontier Refining LLC

SO2 lbs 1-Hr Excess Emissions for 4/1/2014 thru 6/30/2014

| Reason | Duration |
|--|-----------------|
| <i>There are no excess emissions for this report.</i> | |
| Total duration of SO2 lbs 1-Hr excess emissions | 0 |
| Total operating time | 2015 hours |
| Operating time with excess emissions | 0.0% |
| Comment: Form C - Excess Emissions Summary | |

FCCU CEMS Downtime Summary
Frontier Refining LLC
SO2 lbs CEMS Downtime for 4/1/2014 thru 6/30/2014

| Reason | Duration |
|--|-----------------|
| Maintenance - Following Upset of FCCU due to Boiler #1 & #2 Shutdown - Sample System | 13 hours |
| Maintenance - Sample System | 1 hour |
| Process - Ran Low Excess O2 - Wet O2 > Dry O2 causing % Moisture and Lb/Hr to be Invalid | 7 hours |
| Process - Ran Low Excess O2 - Wet O2 > Dry O2 causing % Moisture, Dry Stack Flow and Lb/Hr to be Invalid | 1 hour |
| SO2 Analyzer Malfunction | 3 hours |
| SO2 Analyzer Malfunction - Flow Pressure Transducer | 24 hours |
| <hr/> | |
| Total duration of SO2 lbs CEMS downtime | 49 hours |
| Total operating time | 2015 hours |
| Operating time with CEMS downtime | 2.4% |

Comment: Form D - Downtime Summary

FCCU CEMS Downtime
Frontier Refining LLC
SO2 lbs CEMS Downtime for 4/1/2014 thru 6/30/2014

| Parameter | Start | End | Duration | Reason | Action |
|-----------|--------------------|----------|----------|--|---|
| SO2 lbs | 4/11/2014 7:00 AM | 7:59 AM | 1 hour | Maintenance - Sample System | Took stack out of service to clean and change filters and service sample dryer. Passed Manual Calibration. |
| SO2 lbs | 4/22/2014 10:00 PM | 10:59 PM | 1 hour | SO2 Analyzer Malfunction | Cleared fault and troubleshot issue. Found flow reading on SO2 instrument wasn't reading correctly and was reading low. Adjusted flow to nominal. |
| SO2 lbs | 5/3/2014 9:00 AM | 9:59 AM | 1 hour | SO2 Analyzer Malfunction - Flow Pressure Transducer | Replaced transducer and ran calibration & validation. |
| SO2 lbs | 5/3/2014 12:00 PM | 2:59 PM | 3 hours | SO2 Analyzer Malfunction - Flow Pressure Transducer | Replaced transducer and ran calibration & validation. |
| SO2 lbs | 5/3/2014 4:00 PM | 6:59 PM | 3 hours | SO2 Analyzer Malfunction - Flow Pressure Transducer | Replaced transducer and ran calibration & validation. |
| SO2 lbs | 5/3/2014 9:00 PM | 9:59 PM | 1 hour | SO2 Analyzer Malfunction - Flow Pressure Transducer | Replaced transducer and ran calibration & validation. |
| SO2 lbs | 5/4/2014 7:00 AM | 7:59 AM | 1 hour | SO2 Analyzer Malfunction - Flow Pressure Transducer | Replaced transducer and ran calibration & validation. |
| SO2 lbs | 5/4/2014 11:00 AM | 12:59 PM | 2 hours | SO2 Analyzer Malfunction - Flow Pressure Transducer | Replaced transducer and ran calibration & validation. |
| SO2 lbs | 5/4/2014 2:00 PM | 2:59 PM | 1 hour | SO2 Analyzer Malfunction - Flow Pressure Transducer | Replaced transducer and ran calibration & validation. |
| SO2 lbs | 5/4/2014 5:00 PM | 11:59 PM | 7 hours | SO2 Analyzer Malfunction - Flow Pressure Transducer | Replaced transducer and ran calibration & validation. |
| SO2 lbs | 5/5/2014 12:00 AM | 4:59 AM | 5 hours | SO2 Analyzer Malfunction - Flow Pressure Transducer | Replaced transducer and ran calibration & validation. |
| SO2 lbs | 5/11/2014 12:00 AM | 12:59 AM | 1 hour | SO2 Analyzer Malfunction | Self Corrected |
| SO2 lbs | 6/8/2014 8:00 AM | 8:59 AM | 1 hour | SO2 Analyzer Malfunction | Self Corrected |
| SO2 lbs | 6/13/2014 10:00 AM | 10:59 PM | 13 hours | Maintenance - Following Upset of FCCU due to Boiler #1 & #2 Shutdown - Sample System | Cleaned sample probe filter |
| SO2 lbs | 6/13/2014 11:00 PM | 11:59 PM | 1 hour | Process - Ran Low Excess O2 - Wet O2 > Dry O2 causing % Moisture and Lb/Hr to be Invalid | Adjusted Excess O2. Morning Calibration Check Corrected Discrepancy. |

| Parameter | Start | End | Duration | Reason | Action |
|----------------|--------------------|----------|----------|--|--|
| SO2 lbs | 6/14/2014 12:00 AM | 5:59 AM | 6 hours | Process - Ran Low Excess O2 - Wet O2 > Dry O2 causing % Moisture and Lb/Hr to be Invalid | Adjusted Excess O2. Morning Calibration Check Corrected Discrepancy. |
| SO2 lbs | 6/23/2014 10:00 PM | 10:59 PM | 1 hour | Process - Ran Low Excess O2 - Wet O2 > Dry O2 causing % Moisture, Dry Stack Flow and Lb/Hr to be Invalid | FCCU Shutdown |
| Total duration | | | 49 hours | | |

Comment: Form D - Downtime Summary

2Q14

DEPARTMENT OF ENVIRONMENTAL QUALITY
AIR QUALITY DIVISION
CONTINUOUS EMISSION MONITORING REPORT

FORM A

I. GENERAL INFORMATION

- A. Facility Name: FRONTIER REFINING LLC
B. Process Unit/Pollutant Monitored: CO MONITORING SYSTEM - FLUIDIZED CATALYTIC CRACKING UNIT (FCCU) REGENERATOR
C. Applicable Permit Number or Regulation: 3-0-149-2; MACT Subpart UUU; Consent Decree; MD-9640
D. Applicable Emission Limit: 500 ppm (1-hr); 500 ppmvd @ 0% O₂ (1-hr); 100 ppmvd @ 0% O₂ (365 day rolling average); 30 lb/hr (1-hr); 18.2 lb/hr (365 day rolling average)

II. MONITOR INFORMATION

- A. Date of Original Monitor Installation: 6/5/2012
B. Date of Latest Monitor Certification: 7/17/2012
C. Pollutant/Opacity Monitor
1. Manufacturer: Teledyne/API
2. Model Number: Model 300H
3. Serial Number Main Chassis: 186
4. Basis of Measurement (If Applicable - Wet or Dry): Dry
5. Instrument Span, Range Value (Specify Units): 0-1000 ppm
D. Diluent Monitor NONE
1. Type of Monitor: O₂ or CO₂ (circle one)
2. Manufacturer:
3. Model Number:
4. Serial Number Main Chassis:
5. Basis of Measurement (If Applicable - Wet or Dry):
6. Instrument Span, Range Value (Specify Units): _____
E. Flow Monitor
1. Type of Instrument (i.e. S-type Pitot Tube): S-Type Pitot Tube
2. Manufacturer: Dieterich Standard
3. Model Number: PSF-S4H HSVH FADH0 FADC
4. Serial Number Main Chassis: DFCII CEM 1MN 2XX #MN 4MN P1 ES RB TR AR YX ZS DB
F. Quality Assurance Data
1. QA Plan Date: 10/15/2012
2. QA Plan Approval Date: 4/22/2013

III. Operating/Monitoring Data

A. Quarter: 2 Year: 2014

B Total Hours in Reporting Period: 2184

C. Hours Unit Operated During the Reporting Period: 2015

Note: Include all unit operating time for the quarter including operating time associated with Startup/Shutdown and Chapter 1 Section 5 (Emergency/Abnormal) Operations. Report time in hours to one decimal place, i.e. 1902.8.

IV. Quarterly Audits/Monitoring System Modifications

A. Quarterly Audits
Type Audit: RATA

| | | |
|----------------------------|-----------------------|-------------|
| | <u>Date Conducted</u> | <u>Pass</u> |
| Pollutant/Opacity Monitor: | <u>5/13/2014</u> | <u>YES</u> |

Note: A copy of the quarterly audits shall be included with the corresponding quarterly excess emission report.

B. Equipment Replaced During Reporting Period: Changed out Filters; Replaced Flow Pressure Transducer.

Note: Only equipment replacements or modifications to the system that could affect the ability of the continuous monitoring system to comply with the associated Performance Specification shall be reported.

V. Report Contact

A. Name: David Weeks, Environmental Engineer

B. Phone Number: (307) 771-8827

2Q14

EXCESS EMISSION SUMMARY REPORT
FCCU CO (ppm) (1-hr average) CEMS
1-hr average limit = 500 ppm

FORM B

| Emission Data Summary | | CMS Performance Report | |
|--|-------------|---|-------------|
| I. Duration of Excess Emission in Reporting Period Due to: | | I. CMS Downtime in Reporting Period Due to: | |
| A. Startup/Shutdown | 0.0 | A. Monitor Equipment Malfunction | 14.0 |
| B. Control Equipment Problems | 0.0 | B. Non-Monitor Equipment Malfunctions | 2.0 |
| C. Process Problem | 4.0 | C. Quality Assurance Calibration | 0.0 |
| D. Other Known Causes | 0.0 | D. Other Known Causes | 0.0 |
| E. Unknown Causes | 0.0 | E. Unknown Causes | 0.0 |
| II. Total Duration of Excess Emission | 4.0 | II. Total CMS Downtime | 16.0 |
| III. Total Duration of Excess Emissions x 100 divided by Total Source Operating Time minus Total CMS Downtime | 0.2% | III. Total CMS Downtime x 100 divided by Total Source Operating Time | 0.8% |

Total time of excess emission events due to emergency/abnormal operations: 0.

NOTE:

1. Only report excess emissions which occur when the unit/process is operating. Include all excess emissions in the Emission Data Summary including those excess emissions associated with startup/shutdown and those excess emissions associated with Chapter 1 Section 5 (Emergency/Abnormal) operations. Report times in hours for gaseous monitors and in tenths of an hour for opacity monitors. Include detailed excess emission information and causes in the Excess Emission Table (Form C).
2. Only report CEM downtime which occurs while the unit/process is operating. Report time in hours to one decimal point. Include detailed CEM downtime and causes in the Monitor Outage Table (Form D).
3. Include an explanation of what corrective actions were taken for total excess emissions or monitor downtime for the quarter (Emission Data Summary and CMS Performance Summary, Item III) greater than 5%. (See Instructions for further details.)

FCCU Excess Emissions Summary

Frontier Refining LLC

CO ppm 1-Hr Excess Emissions for 4/1/2014 thru 6/30/2014

| Reason | Duration |
|---|-----------------|
| Emission Exceedance - CO ppm @ 0% O2 and CO Lb/Hr - Rate Change - Low Excess O2 | 1 hour |
| Emission Exceedance - CO ppm, CO ppm @ 0% O2 and CO Lb/Hr - Low Excess O2 | 1 hour |
| Process Upset - Low Excess O2 from Raising LCO Rate | 1 hour |
| Process Upset - Low Excess O2 from Rate Increase and LCO Rate Increase - Ran Out of Blower Capacity | 1 hour |
| <hr/> | |
| Total duration of CO ppm 1-Hr excess emissions | 4 hours |
| Total operating time | 2016 hours |
| Operating time with excess emissions | 0.2% |

Comment: Form C - Excess Emissions Summary

FCCU Excess Emissions
Frontier Refining LLC
CO ppm 1-Hr Excess Emissions for 4/1/2014 thru 6/30/2014

| Parameter | Start | End | Duration | Value | Min | Max | Limit | Reason | Action |
|----------------|-------------------|---------|----------|--------|--------|--------|-------|---|--|
| CO ppm 1-Hr | 5/2/2014 8:00 AM | 8:59 AM | 1 hour | 533.10 | 533.10 | 533.10 | 500 | Process Upset - Low Excess O2 from Raising LCO Rate | Adjusted Excess O2 |
| CO ppm 1-Hr | 5/2/2014 2:00 PM | 2:59 PM | 1 hour | 514.10 | 514.10 | 514.10 | 500 | Process Upset - Low Excess O2 from Rate Increase and LCO Rate Increase - Ran Out of Blower Capacity | Adjusted Rate to meet Blower Capacity and Adjusted Excess O2 |
| CO ppm 1-Hr | 5/28/2014 1:00 PM | 1:59 PM | 1 hour | 638.80 | 638.80 | 638.80 | 500 | Emission Exceedance - CO ppm @ 0% O2 and CO Lb/Hr - Rate Change - Low Excess O2 | Adjusted Unit Operation and Excess O2 |
| CO ppm 1-Hr | 6/16/2014 1:00 PM | 1:59 PM | 1 hour | 522.30 | 522.30 | 522.30 | 500 | Emission Exceedance - CO ppm, CO ppm @ 0% O2 and CO Lb/Hr - Low Excess O2 | Raised Excess O2 and Trimmed Rate 400 BPD |
| Total duration | | | 4 hours | | | | | | |

Comment: Form C - Excess Emissions Summary

FCCU CEMS Downtime Summary
Frontier Refining LLC
CO ppm CEMS Downtime for 4/1/2014 thru 6/30/2014

| Reason | Duration |
|--|------------|
| Maintenance - Following Upset of FCCU due to Boiler #1 & #2 Shutdown - Sample System | 13 hours |
| Maintenance - Sample System | 1 hour |
| Process - Ran Low Excess O2 - Wet O2 > Dry O2 causing % Moisture, Dry Stack Flow and Lb/Hr to be Invalid | 2 hours |
| Total duration of CO ppm CEMS downtime | 16 hours |
| Total operating time | 2015 hours |
| Operating time with CEMS downtime | 0.8% |

Comment: Form D - Downtime Summary

FCCU CEMS Downtime
Frontier Refining LLC
CO ppm CEMS Downtime for 4/1/2014 thru 6/30/2014

| Parameter | Start | End | Duration | Reason | Action |
|----------------|--------------------|----------|----------|--|--|
| CO ppm | 4/11/2014 7:00 AM | 7:59 AM | 1 hour | Maintenance - Sample System | Took stack out of service to clean and change filters and service sample dryer. Passed Manual Calibration. |
| CO ppm | 6/13/2014 10:00 AM | 10:59 PM | 13 hours | Maintenance - Following Upset of FCCU due to Boiler #1 & #2 Shutdown - Sample System | Cleaned sample probe filter |
| CO ppm | 6/23/2014 9:00 PM | 10:59 PM | 2 hours | Process - Ran Low Excess O2 - Wet O2 > Dry O2 causing % Moisture, Dry Stack Flow and Lb/Hr to be invalid | FCCU Shutdown |
| Total duration | | | 16 hours | | |

Comment: Form D - Downtime Summary

2Q14

EXCESS EMISSION SUMMARY REPORT
FCCU CO (ppmvd) @ 0% O₂ (1-hr average) CEMS
1-hr average limit = 500 ppmvd @ 0% O₂

FORM B

| Emission Data Summary | | CMS Performance Report | |
|--|-------------|---|-------------|
| I. Duration of Excess Emission in Reporting Period Due to: | | I. CMS Downtime in Reporting Period Due to: | |
| A. Startup/Shutdown | 0.0 | A. Monitor Equipment Malfunction | 14.0 |
| B. Control Equipment Problems | 0.0 | B. Non-Monitor Equipment Malfunctions | 2.0 |
| C. Process Problem | 4.0 | C. Quality Assurance Calibration | 0.0 |
| D. Other Known Causes | 0.0 | D. Other Known Causes | 0.0 |
| E. Unknown Causes | 0.0 | E. Unknown Causes | 0.0 |
| II. Total Duration of Excess Emission | 4.0 | II. Total CMS Downtime | 16.0 |
| III. Total Duration of Excess Emissions x 100 divided by Total Source Operating Time minus Total CMS Downtime | 0.2% | III. Total CMS Downtime x 100 divided by Total Source Operating Time | 0.8% |

Total time of excess emission events due to emergency/abnormal operations: 0.

NOTE:

1. Only report excess emissions which occur when the unit/process is operating. Include all excess emissions in the Emission Data Summary including those excess emissions associated with startup/shutdown and those excess emissions associated with Chapter 1 Section 5 (Emergency/Abnormal) operations. Report times in hours for gaseous monitors and in tenths of an hour for opacity monitors. Include detailed excess emission information and causes in the Excess Emission Table (Form C).
2. Only report CEM downtime which occurs while the unit/process is operating. Report time in hours to one decimal point. Include detailed CEM downtime and causes in the Monitor Outage Table (Form D).
3. Include an explanation of what corrective actions were taken for total excess emissions or monitor downtime for the quarter (Emission Data Summary and CMS Performance Summary, Item III) greater than 5%. (See Instructions for further details.)

2Q14

EXCESS EMISSION SUMMARY REPORT
FCCU CO (ppmvd) @ 0% O₂ (365-day rolling average) CEMS
365-day rolling average = 100 ppmvd @ 0% O₂

FORM B

| Emission Data Summary | | CMS Performance Report | |
|--|-------------|---|-------------|
| I. Duration of Excess Emission in Reporting Period Due to: | | I. CMS Downtime in Reporting Period Due to: | |
| A. Startup/Shutdown | 0.0 | A. Monitor Equipment Malfunction | 14.0 |
| B. Control Equipment Problems | 0.0 | B. Non-Monitor Equipment Malfunctions | 2.0 |
| C. Process Problem | 0.0 | C. Quality Assurance Calibration | 0.0 |
| D. Other Known Causes | 0.0 | D. Other Known Causes | 0.0 |
| E. Unknown Causes | 0.0 | E. Unknown Causes | 0.0 |
| II. Total Duration of Excess Emission | 0.0 | II. Total CMS Downtime | 16.0 |
| III. Total Duration of Excess Emissions x 100 divided by Total Source Operating Time minus Total CMS Downtime | 0.0% | III. Total CMS Downtime x 100 divided by Total Source Operating Time | 0.8% |

Total time of excess emission events due to emergency/abnormal operations: 0.

NOTE:

1. Only report excess emissions which occur when the unit/process is operating. Include all excess emissions in the Emission Data Summary including those excess emissions associated with startup/shutdown and those excess emissions associated with Chapter 1 Section 5 (Emergency/Abnormal) operations. Report times in hours for gaseous monitors and in tenths of an hour for opacity monitors. Include detailed excess emission information and causes in the Excess Emission Table (Form C).
2. Only report CEM downtime which occurs while the unit/process is operating. Report time in hours to one decimal point. Include detailed CEM downtime and causes in the Monitor Outage Table (Form D).
3. Include an explanation of what corrective actions were taken for total excess emissions or monitor downtime for the quarter (Emission Data Summary and CMS Performance Summary, Item III) greater than 5%. (See Instructions for further details.)
4. Rolling 7-day and 365-day averages are calculated for each day the emission source is operating, including days when the analyzer has downtime. A null value is used for days in a rolling average period where the unit is not operating or the CEMS downtime causes insufficient data for a valid daily average. This can result in a day where the data is considered to be both an excess emission and analyzer downtime.

FCCU Excess Emissions Summary

Frontier Refining LLC

CO ppm @0% O2 1-Hr Excess Emissions for 4/1/2014 thru 6/30/2014

| Reason | Duration |
|---|-----------------|
| Emission Exceedance - CO ppm @ 0% O2 and CO Lb/Hr - Rate Change - Low Excess O2 | 1 hour |
| Emission Exceedance - CO ppm, CO ppm @ 0% O2 and CO Lb/Hr - Low Excess O2 | 1 hour |
| Process Upset - Low Excess O2 from Raising LCO Rate | 1 hour |
| Process Upset - Low Excess O2 from Rate Increase and LCO Rate Increase - Ran Out of Blower Capacity | 1 hour |
| <hr/> | |
| Total duration of CO ppm @0% O2 1-Hr excess emissions | 4 hours |
| Total operating time | 2015 hours |
| Operating time with excess emissions | 0.2% |

Comment: Form C - Excess Emissions Summary

FCCU Excess Emissions

Frontier Refining LLC

CO ppm @0% O2 1-Hr Excess Emissions for 4/1/2014 thru 6/30/2014

| Parameter | Start | End | Duration | Value | Min | Max | Limit | Reason | Action |
|--------------------|-------------------|---------|----------|--------|--------|--------|-------|---|--|
| CO ppm @0% O2 1-Hr | 5/2/2014 6:00 AM | 6:59 AM | 1 hour | 542.20 | 542.20 | 542.20 | 500 | Process Upset - Low Excess O2 from Raising LCO Rate | Adjusted Excess O2 |
| CO ppm @0% O2 1-Hr | 5/2/2014 2:00 PM | 2:59 PM | 1 hour | 520.30 | 520.30 | 520.30 | 500 | Process Upset - Low Excess O2 from Rate Increase and LCO Rate Increase - Ran Out of Blower Capacity | Adjusted Rate to meet Blower Capacity and Adjusted Excess O2 |
| CO ppm @0% O2 1-Hr | 5/28/2014 1:00 PM | 1:59 PM | 1 hour | 647.20 | 647.20 | 647.20 | 500 | Emission Exceedance - CO ppm @ 0% O2 and CO Lb/Hr - Rate Change - Low Excess O2 | Adjusted Unit Operation and Excess O2 |
| CO ppm @0% O2 1-Hr | 6/16/2014 1:00 PM | 1:59 PM | 1 hour | 535.10 | 535.10 | 535.10 | 500 | Emission Exceedance - CO ppm, CO ppm @ 0% O2 and CO Lb/Hr - Low Excess O2 | Raised Excess O2 and Trimmed Rate 400 BPD |
| Total duration | | | 4 hours | | | | | | |

Comment: Form C - Excess Emissions Summary

FCCU Excess Emissions Summary

Frontier Refining LLC

CO ppm @0% O2 365-Day Rolling Excess Emissions for 4/1/2014 thru 6/30/2014

| Reason | Duration |
|--------|----------|
|--------|----------|

There are no excess emissions for this report.

| | |
|--|------------|
| Total duration of CO ppm @0% O2 365-Day Rolling excess emissions | 0 |
| Total operating time | 2015 hours |
| Operating time with excess emissions | 0.0% |

Comment: Form C - Excess Emissions Summary

FCCU CEMS Downtime Summary

Frontier Refining LLC

CO ppm @0% O2 CEMS Downtime for 4/1/2014 thru 6/30/2014

| Reason | Duration |
|--|-----------------|
| Maintenance - Following Upset of FCCU due to Boiler #1 & #2 Shutdown - Sample System | 13 hours |
| Maintenance - Sample System | 1 hour |
| Process - Ran Low Excess O2 - Wet O2 > Dry O2 causing % Moisture, Dry Stack Flow and Lb/Hr to be Invalid | 2 hours |
| <hr/> | |
| Total duration of CO ppm @0% O2 CEMS downtime | 16 hours |
| Total operating time | 2015 hours |
| Operating time with CEMS downtime | 0.8% |

Comment: Form D - Downtime Summary

FCCU CEMS Downtime

Frontier Refining LLC

CO ppm @0% O2 CEMS Downtime for 4/1/2014 thru 6/30/2014

| Parameter | Start | End | Duration | Reason | Action |
|----------------|--------------------|----------|----------|--|--|
| CO ppm @0% O2 | 4/11/2014 7:00 AM | 7:59 AM | 1 hour | Maintenance - Sample System | Took stack out of service to clean and change filters and service sample dryer. Passed Manual Calibration. |
| CO ppm @0% O2 | 6/13/2014 10:00 AM | 10:59 PM | 13 hours | Maintenance - Following Upset of FCCU due to Boiler #1 & #2 Shutdown - Sample System | Cleaned sample probe filter |
| CO ppm @0% O2 | 6/23/2014 9:00 PM | 10:59 PM | 2 hours | Process - Ran Low Excess O2 - Wet O2 > Dry O2 causing % Moisture, Dry Stack Flow and Lb/Hr to be Invalid | FCCU Shutdown |
| Total duration | | | 16 hours | | |

Comment: Form D - Downtime Summary

2Q14

EXCESS EMISSION SUMMARY REPORT
FCCU CO (lb/hr) CEMS
1-hr average limit = 30 lb/hr

FORM B

| Emission Data Summary | | CMS Performance Report | |
|--|-------------|---|-------------|
| I. Duration of Excess Emission in Reporting Period Due to: | | I. CMS Downtime in Reporting Period Due to: | |
| A. Startup/Shutdown | 0.0 | A. Monitor Equipment Malfunction | 14.0 |
| B. Control Equipment Problems | 0.0 | B. Non-Monitor Equipment Malfunctions | 9.0 |
| C. Process Problem | 4.0 | C. Quality Assurance Calibration | 0.0 |
| D. Other Known Causes | 0.0 | D. Other Known Causes | 0.0 |
| E. Unknown Causes | 0.0 | E. Unknown Causes | 0.0 |
| II. Total Duration of Excess Emission | 4.0 | II. Total CMS Downtime | 23.0 |
| III. Total Duration of Excess Emissions x 100 divided by Total Source Operating Time minus Total CMS Downtime | 0.2% | III. Total CMS Downtime x 100 divided by Total Source Operating Time | 1.1% |

Total time of excess emission events due to emergency/abnormal operations: 0 .

NOTE:

1. Only report excess emissions which occur when the unit/process is operating. Include all excess emissions in the Emission Data Summary including those excess emissions associated with startup/shutdown and those excess emissions associated with Chapter 1 Section 5 (Emergency/Abnormal) operations. Report times in hours for gaseous monitors and in tenths of an hour for opacity monitors. Include detailed excess emission information and causes in the Excess Emission Table (Form C).
2. Only report CEM downtime which occurs while the unit/process is operating. Report time in hours to one decimal point. Include detailed CEM downtime and causes in the Monitor Outage Table (Form D).
3. Include an explanation of what corrective actions were taken for total excess emissions or monitor downtime for the quarter (Emission Data Summary and CMS Performance Summary, Item III) greater than 5%. (See Instructions for further details.)

2Q14

EXCESS EMISSION SUMMARY REPORT
FCCU CO (lb/hr) CEMS
365-day rolling average = 18.2 lb/hr

FORM B

| Emission Data Summary | | CMS Performance Report | |
|--|-------------|---|-------------|
| I. Duration of Excess Emission in Reporting Period Due to: | | I. CMS Downtime in Reporting Period Due to: | |
| A. Startup/Shutdown | 0.0 | A. Monitor Equipment Malfunction | 14.0 |
| B. Control Equipment Problems | 0.0 | B. Non-Monitor Equipment Malfunctions | 9.0 |
| C. Process Problem | 0.0 | C. Quality Assurance Calibration | 0.0 |
| D. Other Known Causes | 0.0 | D. Other Known Causes | 0.0 |
| E. Unknown Causes | 0.0 | E. Unknown Causes | 0.0 |
| II. Total Duration of Excess Emission | 0.0 | II. Total CMS Downtime | 23.0 |
| III. Total Duration of Excess Emissions x 100 divided by Total Source Operating Time minus Total CMS Downtime | 0.0% | III. Total CMS Downtime x 100 divided by Total Source Operating Time | 1.1% |

Total time of excess emission events due to emergency/abnormal operations: 0.

NOTE:

1. Only report excess emissions which occur when the unit/process is operating. Include all excess emissions in the Emission Data Summary including those excess emissions associated with startup/shutdown and those excess emissions associated with Chapter 1 Section 5 (Emergency/Abnormal) operations. Report times in hours for gaseous monitors and in tenths of an hour for opacity monitors. Include detailed excess emission information and causes in the Excess Emission Table (Form C).
2. Only report CEM downtime which occurs while the unit/process is operating. Report time in hours to one decimal point. Include detailed CEM downtime and causes in the Monitor Outage Table (Form D).
3. Include an explanation of what corrective actions were taken for total excess emissions or monitor downtime for the quarter (Emission Data Summary and CMS Performance Summary, Item III) greater than 5%. (See Instructions for further details.)
4. Rolling 7-day and 365-day averages are calculated for each day the emission source is operating, including days when the analyzer has downtime. A null value is used for days in a rolling average period where the unit is not operating or the CEMS downtime causes insufficient data for a valid daily average. This can result in a day where the data is considered to be both an excess emission and analyzer downtime.

FCCU Excess Emissions Summary

Frontier Refining LLC

CO lbs 1-Hr Excess Emissions for 4/1/2014 thru 6/30/2014

| Reason | Duration |
|---|-----------------|
| Emission Exceedance - CO ppm @ 0% O2 and CO Lb/Hr - Rate Change - Low Excess O2 | 1 hour |
| Emission Exceedance - CO ppm, CO ppm @ 0% O2 and CO Lb/Hr - Low Excess O2 | 2 hours |
| Process Upset - Low Excess O2 from Raising LCO Rate | 1 hour |
| <hr/> | |
| Total duration of CO lbs 1-Hr excess emissions | 4 hours |
| Total operating time | 2015 hours |
| Operating time with excess emissions | 0.2% |

Comment: Form C - Excess Emissions Summary

FCCU Excess Emissions

Frontier Refining LLC

CO lbs 1-Hr Excess Emissions for 4/1/2014 thru 6/30/2014

| Parameter | Start | End | Duration | Value | Min | Max | Limit | Reason | Action |
|----------------|--------------------|---------|----------|-------|------|------|-------|---|---|
| CO lbs 1-Hr | 5/2/2014 6:00 AM | 6:59 AM | 1 hour | 32.1 | 32.1 | 32.1 | 30 | Process Upset - Low Excess O2 from Raising LCO Rate | Adjusted Excess O2 |
| CO lbs 1-Hr | 5/28/2014 1:00 PM | 1:59 PM | 1 hour | 42.1 | 42.1 | 42.1 | 30 | Emission Exceedance - CO ppm @ 0% O2 and CO Lb/Hr - Rate Change - Low Excess O2 | Adjusted Unit Operation and Excess O2 |
| CO lbs 1-Hr | 6/16/2014 12:00 PM | 1:59 PM | 2 hours | 43.5 | 35.3 | 51.7 | 30 | Emission Exceedance - CO ppm, CO ppm @ 0% O2 and CO Lb/Hr - Low Excess O2 | Raised Excess O2 and Trimmed Rate 400 BPD |
| Total duration | | | 4 hours | | | | | | |

Comment: Form C - Excess Emissions Summary

FCCU Excess Emissions Summary

Frontier Refining LLC

CO lbs/hr 365-Day Rolling Excess Emissions for 4/1/2014 thru 6/30/2014

| Reason | Duration |
|--|------------|
| <i>There are no excess emissions for this report.</i> | |
| Total duration of CO lbs/hr 365-Day Rolling excess emissions | 0 |
| Total operating time | 2015 hours |
| Operating time with excess emissions | 0.0% |

Comment: Form C - Excess Emissions Summary

FCCU CEMS Downtime Summary
Frontier Refining LLC
CO lbs CEMS Downtime for 4/1/2014 thru 6/30/2014

| Reason | Duration |
|--|------------|
| Maintenance - Following Upset of FCCU due to Boiler #1 & #2 Shutdown - Sample System | 13 hours |
| Maintenance - Sample System | 1 hour |
| Process - Ran Low Excess O2 - Wet O2 > Dry O2 causing % Moisture and Lb/Hr to be Invalid | 7 hours |
| Process - Ran Low Excess O2 - Wet O2 > Dry O2 causing % Moisture, Dry Stack Flow and Lb/Hr to be Invalid | 2 hours |
| <hr/> | |
| Total duration of CO lbs CEMS downtime | 23 hours |
| Total operating time | 2016 hours |
| Operating time with CEMS downtime | 1.1% |

Comment: Form D - Downtime Summary

FCCU CEMS Downtime
Frontier Refining LLC
CO lbs CEMS Downtime for 4/1/2014 thru 6/30/2014

| Parameter | Start | End | Duration | Reason | Action |
|----------------|--------------------|----------|----------|--|--|
| CO lbs | 4/11/2014 7:00 AM | 7:59 AM | 1 hour | Maintenance - Sample System | Took stack out of service to clean and change filters and service sample dryer. Passed Manual Calibration. |
| CO lbs | 6/13/2014 10:00 AM | 10:59 PM | 13 hours | Maintenance - Following Upset of FCCU due to Boiler #1 & #2 Shutdown - Sample System | Cleaned sample probe filter |
| CO lbs | 6/13/2014 11:00 PM | 11:59 PM | 1 hour | Process - Ran Low Excess O2 - Wet O2 > Dry O2 causing % Moisture and Lb/Hr to be Invalid | Adjusted Excess O2. Morning Calibration Check Corrected Discrepancy. |
| CO lbs | 6/14/2014 12:00 AM | 5:59 AM | 6 hours | Process - Ran Low Excess O2 - Wet O2 > Dry O2 causing % Moisture and Lb/Hr to be Invalid | Adjusted Excess O2. Morning Calibration Check Corrected Discrepancy. |
| CO lbs | 6/23/2014 9:00 PM | 10:59 PM | 2 hours | Process - Ran Low Excess O2 - Wet O2 > Dry O2 causing % Moisture, Dry Stack Flow and Lb/Hr to be Invalid | FCCU Shutdown |
| Total duration | | | 23 hours | | |

Comment: Form D - Downtime Summary

2Q14

DEPARTMENT OF ENVIRONMENTAL QUALITY
AIR QUALITY DIVISION
CONTINUOUS EMISSION MONITORING REPORT

FORM A

I. GENERAL INFORMATION

- A. Facility Name: FRONTIER REFINING LLC
- B. Process Unit/Pollutant Monitored: PM MONITORING SYSTEM - FLUIDIZED CATALYTIC CRACKING UNIT (FCCU) REGENERATOR
- C. Applicable Permit Number or Regulation: Consent Decree, MD-9640, and MACT Subpart UUU
- D. Applicable Emission Limit: 70.8 lb/hr (3-hr average); 0.029 lb Ni/hr (1-hr average)

II. MONITOR INFORMATION Laser Hawk PM Monitor

- A. Date of Original Monitor Installation: May 2011
- B. Date of Latest Monitor Certification: December 2012 (Approved 4/22/2013)

C. Pollutant/Opacity Monitor

- 1. Manufacturer: Teledyne Instruments
- 2. Model Number: 360 PM Laser Hawk
- 3. Serial Number Main Chassis: 360085
- 4. Basis of Measurement (If Applicable - Wet or Dry): NA
- 5. Instrument Span, Range Value (Specify Units): NA

D. Diluent Monitor NONE

- 1. Type of Monitor: O₂ or CO₂ (circle one)
- 2. Manufacturer:
- 3. Model Number:
- 4. Serial Number Main Chassis
- 5. Basis of Measurement (If Applicable - Wet or Dry):
- 6. Instrument Span, Range Value (Specify Units):__

E. Flow Monitor NONE

- 1. Type of Instrument (i.e. S-type Pitot Tube):
- 2. Manufacturer:
- 3. Model Number: _
- 4. Serial Number Main Chassis:

F. Quality Assurance Data

- 1. QA Plan Date: 2/15/2013
- 2. QA Plan Approval Date: 4/22/2013

III. Operating/Monitoring Data

A. Quarter: 2 Year: 2014

B Total Hours in Reporting Period: 2184

C. Hours Unit Operated During the Reporting Period: 2015

Note: Include all unit operating time for the quarter including operating time associated with Startup/Shutdown and Chapter 1 Section 5 (Emergency/Abnormal) Operations. Report time in hours to one decimal place, i.e. 1902.8.

IV. Quarterly Audits/Monitoring System Modifications

A. Quarterly Audits
Type Audit: ACA

| | | |
|----------------------------|-----------------------|-------------|
| | <u>Date Conducted</u> | <u>Pass</u> |
| Pollutant/Opacity Monitor: | <u>6/9/2014</u> | <u>Yes</u> |

Equipment Replaced During Reporting Period: None.

Note: Only equipment replacements or modifications to the system that could affect the ability of the continuous monitoring system to comply with the associated Performance Specification shall be reported.

V. Report Contact

A. Name: David Weeks, Environmental Engineer

B. Phone Number: (307) 771-8827

2Q14

EXCESS EMISSION SUMMARY REPORT
FCCU PM (lb/hr) CEMS
3-hr average limit = 70.8 lb/hr

FORM B

| Emission Data Summary | | CMS Performance Report | |
|--|-------------|---|-------------|
| I. Duration of Excess Emission in Reporting Period Due to: | | I. CMS Downtime in Reporting Period Due to: | |
| A. Startup/Shutdown | 0.0 | A. Monitor Equipment Malfunction | 2.0 |
| B. Control Equipment Problems | 0.0 | B. Non-Monitor Equipment Malfunctions | 0.0 |
| C. Process Problem | 0.0 | C. Quality Assurance Calibration | 0.0 |
| D. Other Known Causes | 0.0 | D. Other Known Causes | 0.0 |
| E. Unknown Causes | 0.0 | E. Unknown Causes | 0.0 |
| II. Total Duration of Excess Emission | 0.0 | II. Total CMS Downtime | 2.0 |
| III. Total Duration of Excess Emissions x 100 divided by Total Source Operating Time minus Total CMS Downtime | 0.0% | III. Total CMS Downtime x 100 divided by Total Source Operating Time | 0.1% |

Total time of excess emission events due to emergency/abnormal operations: 0.

NOTE:

1. Only report excess emissions which occur when the unit/process is operating. Include all excess emissions in the Emission Data Summary including those excess emissions associated with startup/shutdown and those excess emissions associated with Chapter 1 Section 5 (Emergency/Abnormal) operations. Report times in hours for gaseous monitors and in tenths of an hour for opacity monitors. Include detailed excess emission information and causes in the Excess Emission Table (Form C).
2. Only report CEM downtime which occurs while the unit/process is operating. Report time in hours to one decimal point. Include detailed CEM downtime and causes in the Monitor Outage Table (Form D).
3. Include an explanation of what corrective actions were taken for total excess emissions or monitor downtime for the quarter (Emission Data Summary and CMS Performance Summary, Item III) greater than 5%. (See Instructions for further details.)

FCCU Excess Emissions Summary

Frontier Refining LLC

PM lbs 3-Hr Rolling Excess Emissions for 4/1/2014 thru 6/30/2014

| Reason | Duration |
|--|-----------------|
| <i>There are no excess emissions for this report.</i> | |
| Total duration of PM lbs 3-Hr Rolling excess emissions | 0 |
| Total operating time | 2015 hours |
| Operating time with excess emissions | 0.0% |
| Comment: Form C - Excess Emissions Summary | |

FCCU CEMS Downtime Summary

Frontier Refining LLC

PM lbs CEMS Downtime for 4/1/2014 thru 6/30/2014

| Reason | Duration |
|--|------------|
| Particulate Analyzer Fault | 2 hours |
| Total duration of PM lbs CEMS downtime | 2 hours |
| Total operating time | 2015 hours |
| Operating time with CEMS downtime | 0.1% |
| Comment: Form D - Downtime Summary | |

FCCU CEMS Downtime
Frontier Refining LLC
PM lbs CEMS Downtime for 4/1/2014 thru 6/30/2014

| Parameter | Start | End | Duration | Reason | Action |
|----------------|------------------|---------|----------|----------------------------|---|
| PM lbs | 4/5/2014 6:00 AM | 6:59 AM | 1 hour | Particulate Analyzer Fault | Cleaned Lens and Ran Cal to Clear Alarm |
| PM lbs | 5/5/2014 6:00 AM | 6:59 AM | 1 hour | Particulate Analyzer Fault | Cleaned Lens and Ran Cal to Clear Alarm |
| Total duration | | | 2 hours | | |

Comment: Form D - Downtime Summary

2Q14

EXCESS EMISSION SUMMARY REPORT
FCCU PM (Ni lb/hr) CEMS
1-hr average limit = 0.029 lb/hr

FORM B

| Emission Data Summary | | CMS Performance Report | |
|--|-------------|---|-------------|
| I. Duration of Excess Emission in Reporting Period Due to: | | I. CMS Downtime in Reporting Period Due to: | |
| A. Startup/Shutdown | 0.0 | A. Monitor Equipment Malfunction | 2.0 |
| B. Control Equipment Problems | 0.0 | B. Non-Monitor Equipment Malfunctions | 0.0 |
| C. Process Problem | 0.0 | C. Quality Assurance Calibration | 0.0 |
| D. Other Known Causes | 0.0 | D. Other Known Causes | 2.0 |
| E. Unknown Causes | 0.0 | E. Unknown Causes | 0.0 |
| II. Total Duration of Excess Emission | 0.0 | II. Total CMS Downtime | 2.0 |
| III. Total Duration of Excess Emissions x 100 divided by Total Source Operating Time minus Total CMS Downtime | 0.0% | III. Total CMS Downtime x 100 divided by Total Source Operating Time | 0.2% |

Total time of excess emission events due to emergency/abnormal operations: 0.

NOTE:

1. Only report excess emissions which occur when the unit/process is operating. Include all excess emissions in the Emission Data Summary including those excess emissions associated with startup/shutdown and those excess emissions associated with Chapter 1 Section 5 (Emergency/Abnormal) operations. Report times in hours for gaseous monitors and in tenths of an hour for opacity monitors. Include detailed excess emission information and causes in the Excess Emission Table (Form C).
2. Only report CEM downtime which occurs while the unit/process is operating. Report time in hours to one decimal point. Include detailed CEM downtime and causes in the Monitor Outage Table (Form D).
3. Include an explanation of what corrective actions were taken for total excess emissions or monitor downtime for the quarter (Emission Data Summary and CMS Performance Summary, Item III) greater than 5%. (See Instructions for further details.)

FCCU Excess Emissions Summary

Frontier Refining LLC

Nickle lbs 1-Hr Excess Emissions for 4/1/2014 thru 6/30/2014

| Reason | Duration |
|--|-----------------|
| <i>There are no excess emissions for this report.</i> | |
| Total duration of Nickle lbs 1-Hr excess emissions | 0 |
| Total operating time | 2015 hours |
| Operating time with excess emissions | 0.0% |
| Comment: Form C - Excess Emissions Summary | |

FCCU CEMS Downtime Summary
Frontier Refining LLC
Nickel lbs CEMS Downtime for 4/1/2014 thru 6/30/2014

| Reason | Duration |
|--|------------|
| Particulate Analyzer Fault | 2 hours |
| Total duration of Nickel lbs CEMS downtime | 2 hours |
| Total operating time | 2015 hours |
| Operating time with CEMS downtime | 0.1% |
| Comment: Form D - Downtime Summary | |

FCCU CEMS Downtime
Frontier Refining LLC
Nickel lbs CEMS Downtime for 4/1/2014 thru 6/30/2014

| Parameter | Start | End | Duration | Reason | Action |
|----------------|------------------|---------|----------|----------------------------|---|
| Nickel lbs | 4/5/2014 6:00 AM | 6:59 AM | 1 hour | Particulate Analyzer Fault | Cleaned Lens and Ran Cal to Clear Alarm |
| Nickel lbs | 5/5/2014 6:00 AM | 6:59 AM | 1 hour | Particulate Analyzer Fault | Cleaned Lens and Ran Cal to Clear Alarm |
| Total duration | | | 2 hours | | |

Comment: Form D - Downtime Summary

Data Sheet for FCCU PM CEM System Absolute Correlation Audit (ACA)

Date: June 9, 2014

Time: 9:50 AM

| | Zero % | Low | Mid | 100% |
|-------------------------------------|----------|----------|----------|----------|
| | Analyzer | Analyzer | Analyzer | Analyzer |
| Run 1 | 0.00 | 57.15 | 77.88 | 98.86 |
| Run 2 | (0.03) | 57.78 | 77.95 | 99.02 |
| Run 3 | 0.00 | 57.56 | 77.68 | 99.02 |
| C _{CEM} , R _{CEM} | (1.36) | 57.50 | 77.78 | 98.97 |
| C _{RV} , R _V | 0.00 | 58.00 | 79.30 | 100.00 |
| ACA Accuracy | 1.93 | 0.87 | 1.92 | 1.03 |
| Pass? | Yes | Yes | Yes | Yes |

Signature of Technician(s) performing ACA:



Matt Hobbs, Kevin Marschner and/or Tad Milliken

Calculation of ACA Accuracy:

For Low, Mid & 100% :

Eq. 2-1a $ACA = (R_{CEM} - R_V) / R_V \times 100$

ACA must be +/-10% to pass.

where:

ACA = accuracy of CEM, %
R_{CEM} = average of responses
R_V = certified audit value of gas

For Zero:

Eq. 2-1b $ACA = (C_{CEM} - C_{RV}) / C_S \times 100$

ACA must be +/-7.5% to pass.

where:

ACA = accuracy of CEM, %
C_{CEM} = average of responses
C_{RV} = certified audit value of gas
 $Y \text{ (mg/m}^3\text{)} = 6.4 \times X \text{ (backscatter in \%)} - 1.3$

Attachment B - FCCU

Paragraph 217g Emission Summary

FCCU SOURCE EMISSIONS DATA FOR 2013

| | Actual Emissions | Method of Determination |
|-----|------------------|-------------------------|
| | tons/yr | |
| PM | 82.2 | PM CEMS data |
| SO2 | 68.5 | SO2 CEMS data |
| NOx | 42.5 | NOx CEMS data |
| CO | 17.3 | CO CEMS data |

Section C – FLARING

RCFA Reports

Reports pulled and placed in Flaring file

Frontier Refining LLC
P.O. Box 1588 • Cheyenne, WY 82003-1588

Report Period January 1 – July 31, 2014

| Paragraph | Attachment C - Flaring | Comments |
|-----------|---|--|
| 84 | Semi-Annual Reporting. Within thirty (30) calendar days after the end of the first semi-annual period after the Date of Entry of this Consent Decree (i.e., January 31st or July 31st), and on each subsequent January 31st and July 31st thereafter, FRI and FEDRC shall submit to EPA and the Applicable Intervenor a Semi-Annual report that includes copies of each and every report of all Acid Gas Flaring Incidents and Tail Gas Incidents that FRI and FEDRC was required to prepare under Paragraphs 71 and 82 during the previous six month period (e.g., July to December). FRI and/or FEDRC may elect to submit the Semi-Annual report required by this Paragraph with the Semi-Annual progress report required by Paragraph 216. Each Semi-Annual report shall also include a summary of the Incidents including the following: | A table summarizing all of the incidents is included in this section. The report for each incident is also included. |
| 84a | a. Date; | See table. |
| 84b | b. Summary of root cause(s); | See table. |
| 84c | c. Duration; | See table. |
| 84d | d. Amount of SO2 released; | See table. |
| 84e | e. Any associated penalties for each Incident; | See table. |
| 84f | f. Corrective Action completed; and | See table. |
| 84g | g. A list of all Acid Gas Flaring Incidents, Tail Gas Incidents, and Hydrocarbon Flaring Incidents for which corrective actions are still outstanding. | See table. |
| 84 | Such Semi-Annual report shall also include a summary analysis of any trends identified by FRI and/or FEDRC, as appropriate, in the number, Root Cause, types of corrective action, or other relevant information regarding Acid Gas and Tail Gas Incidents during the previous six-month period. | After reviewing the incidents, there were no trends identified in the number, root cause, types of corrective actions, or other relevant information during the previous six months. |
| 85 | 85. For Hydrocarbon Flaring Incidents occurring more than 180 days after the Date of Entry, at their respective Covered Refineries, FRI and FEDRC shall follow the same investigative, reporting, and corrective action procedures as those set forth in Section VI.J., Paragraphs 71 through 72 for Acid Gas Flaring Incidents; provided however, that in lieu of analyzing possible corrective actions under Paragraph 71.e and taking interim and/or long-term corrective action under Paragraph 72 for a Hydrocarbon Flaring Incident attributable to the Startup or Shutdown of a unit that FRI and/or FEDRC has previously analyzed under this Paragraph, FRI and/or FEDRC, as applicable, may identify such prior analysis when submitting the report required under this Paragraph. At their respective Covered Refineries, FRI and FEDRC shall submit the Hydrocarbon Flaring Incident(s) reports as part of the Semi-Annual Reports required pursuant to Paragraph 84. Stipulated penalties under Paragraphs 74 through 76 shall not apply to Hydrocarbon Flaring Incident(s). The formulas at Paragraph 80, used for calculating the quantity and rate of sulfur dioxide emissions during AG Flaring Incidents, shall be used to calculate the quantity and rate of sulfur dioxide emissions during Hydrocarbon Flaring Incidents. | The table summarizing all incidents includes hydrocarbon flaring events is attached. All incident reports have been completed and are included here. |

| Paragraph | Attachment C - Flaring | Comments |
|-----------|---|-----------------------------------|
| 217e | SO2 emissions from all Acid Gas Flaring and Tail Gas Incidents by flare in tons per year; | Summary of emissions is attached. |

P84 & P85 Summary of Acid Gas, Tail Gas, and Hydrocarbon Flaring Incidents

| Date of Event | Type of Event | Duration (hrs) | SO2 Released (tons) | Root Cause | Corrective Actions Completed? | Corrective Actions Outstanding? | Associated Penalties |
|---------------|------------------------|----------------|---------------------|---|-------------------------------|---------------------------------|----------------------|
| 1/23/2014 | Hydrocarbon | 0.75 | 0.6 | Level indicator for liquid in the naphtha splitter overhead receiver stuck causing too much liquid into the crude compressor knock out drum | Yes | No | N/A |
| 1/26/2014 | Acid Gas | 1.0 | 4.9 | The SRU #2 flow transmitter froze due to extreme cold weather | Yes | No | See Report |
| 1/29/2014 | Hydrocarbon | 8.9 | 0.3 | Too many water boots were draining hydrocarbons due to cold weather | Partial | Yes | N/A |
| 1/31/2014 | Acid Gas | 1.6 | 7.8 | The SRU #1 coarse air transmitter froze due to extreme temperatures | Yes | No | See Report |
| 2/3/2014 | Tail Gas | 1.1 | 0.3 | The board operator did not properly address the low level alarm on the boiler feed water | Yes | No | See Report |
| 2/4/2014 | Acid Gas | 0.2 | 1.3 | The panel view for the Boiler Manangement System (BMS) failed | Yes | No | See Report |
| 2/5/2014 | Acid Gas & Hydrocarbon | 2.2 3.7 | 12.1 | The flame scanner of SRU #1 malfunctioned. If the system does not see a flame on SRU #1, it automatically shuts off the air demand to the unit and then the acid gas into the unit. | Yes | No | See Report |
| 2/11/2014 | Hydrocarbon | 14.8 | 0.5 | Crude VRU Compressor, C-401, was not online when the Crude unit was started. | Yes | No | N/A |
| 2/13/2014 | Acid Gas & Hydrocarbon | 2.2 | 7.1 0.7 | The jumper for the SRU #2 was removed and pilot caused the shut down. | Yes | No | See Report |
| 2/14/2014 | Acid Gas | 10.0 | 73.4 | Excess hydrocarbon in the Amine unit caused by carryover from upsets in the other units upstream | Yes | No | See Report |
| 2/16/2014 | Hydrocarbon | 43.9 | 23.5 | The electric lube oil turbine was not turned on prior to strating the wet gas compressor | Yes | No | N/A |
| 2/17/2014 | Acid Gas | 0.6 | 1.9 | Operations did not adequately monitor the boiler feed water of SRU #2. | Yes | No | See Report |
| 2/26/2014 | Hydrocarbon | 0.6 | 0.5 | The glycol system for C-407 failed. | Partial | Yes | N/A |
| 2/28/2014 | Hydrocarbon | 0.6 | 1.0 | Improper operation of overhead fin fan controls | Yes | No | N/A |
| 3/1/2014 | Hydrocarbon | 7.8 | 0.7 | Water boots were stuck open and drained to the degassing drum. | Yes | No | N/A |
| 3/2/2014 | Hydrocarbon | 2.5 | 1.5 | The air dryer line for the instrument air feeding the boilers was frozen. | Yes | No | N/A |
| 3/2/2014 | Hydrocarbon | 41.3 | 1.5 | The seal of C-402A failed due to the extreme cold temperatures. | Yes | No | N/A |
| 3/3/2014 | Hydrocarbon | 29.2 | 1.7 | Water boots were stuck open and drained to the degassing drum. | Yes | No | N/A |
| 3/5/2014 | Hydrocarbon | 17.0 | 1.9 | The cooling water in the service water cooler was fouled. | Yes | No | N/A |
| 3/19/2014 | Hydrocarbon | 0.8 | 3.6 | Condensate pluggage in the Reboiler | Yes | No | N/A |

| | | | | | | | | |
|-----------|-------------|-----------------|-----------------|---|---------|--------|------------|-----|
| 3/20/2014 | Hydrocarbon | 0.3 | 0.5 | The repairs made to C-408 did not fix the compressor. | Yes | No | N/A | |
| 3/28/2014 | Hydrocarbon | 9.0 | 4.9 | The seal on the cooling water pump for C-407 failed. | Yes | No | N/A | |
| 3/30/2014 | Hydrocarbon | 0.7 | 0.5 | Replacement oil filters for C-407 were not readily available. | Yes | No | N/A | |
| 3/31/2014 | Hydrocarbon | 2.3 | 0.6 | The FGRU compressor needed a solenoid valve replacement. | Yes | No | N/A | |
| 4/5/2014 | Hydrocarbon | 4.9 | 2.8 | A bolt on the compressor crosshead needed to be blinded from service to properly repair the leak. | Yes | No | N/A | |
| 4/25/2014 | Acid Gas | 0.1 | 0.4 | SRU#1 flame scanner malfunction. | Partial | Yes | See Report | |
| 5/29/2014 | Acid Gas | 1.2 | 8.0 | The condensate valve from the overhead line from the SCOT was not closed properly and allowed condensate into the K.O. Drum. | Yes | No | See Report | |
| 6/10/2014 | Hydrocarbon | 0.9 | 0.7 | C-407 compressor fan blades are missing, which causes improper cooling of the compressor. | Partial | Yes | N/A | |
| 6/13/2014 | Hydrocarbon | 3.0 | 0.9 | The reduction of Annulus and Reactor Riser steam at a point in time when cold feed at low rates was being introduced to the Reactor Riser with a marginal Regenerator differential pressure and high temperatures in the Regenerator caused the FCCU catalyst reversal. | Partial | Yes | N/A | |
| 6/16/2014 | Hydrocarbon | 19.4 | 1.0 | The tube leak on exchanger E-7 damaged the float level indicator on the sweet gas knockout drum. | Yes | No | N/A | |
| 6/27/2014 | Hydrocarbon | 35.7 | 1.2 | The crude unit was placed into circulation which caused inadequate gas supply | Yes | No | N/A | |
| 4/3/2013 | Hydrocarbon | Reported 1H2013 | Reported 1H2013 | Blisters were found on the reactor riser causing an emergency shutdown of the FCCU | Yes | 6/2013 | Yes | N/A |

Attachment C - Flaring

P217e Emission Summary

Flare Emission Data
(All Acid Gas and Tail Gas Incidents for 2013)

| Flare Identification | Pollutant | Actual Emissions | Method of Determination |
|----------------------|---|------------------|---|
| | | tons/yr | |
| Main Plant Flare | SO2 | 12.1 | calculations for each exceedance based on engineering estimates |
| Coker Flare | Coker flare does not flare Acid Gas or Tail Gas. | | |
| Old Plant Flare | The Old Plant Flare temporarily operated from October 9, 2013 to October 29, 2013 while the Main Plant Flare was taken out-of-service for the 2013 Turnaround. During this time there were no Acid Gas or Tail Gas flaring incidents. | | |

Section D – HEATERS AND BOILERS

NOx Control Plan

Frontier Refining LLC
P.O. Box 1588 • Cheyenne, WY 82003-1588

Report Period January 1 – July 31, 2013

| Paragraph | Attachment D - Heaters and Boilers | Comments |
|-----------|---|---|
| 44 | For their respective Covered Refineries, FRI and FEDRC shall each submit a detailed NOx control plan ("Control Plan") to EPA and the Applicable Intervenor for review by no later than one hundred and eighty (180) days after Date of Entry, with annual updates, covering the prior calendar year, on August 31st of each year thereafter until implementation of the Control Plan is complete. The Control Plan and its updates shall describe the achieved and anticipated progress of the NOx emissions reductions program for heaters and boilers and shall contain the following information for each heater and boiler greater than 40 mmBTU/hr that FRI and FEDRC plan to use to satisfy the requirements of Paragraphs 42, 45 and 46: | As required for the August 31 submissions, the updated Nox Control Plan is included in this section. |
| 44a | All of the information in Appendix A; | See NOx Control Plan. |
| 44b | Identification of the type of Qualifying Controls installed or planned with date installed or planned (including identification of the heaters and boilers to be permanently shut down); | See NOx Control Plan. |
| 44c | To the extent limits exist or are planned, the allowable NOx emission rates (in lbs/mmBTU (HHV), with averaging period) and allowable heat input rate (in mmBTU/hr (HHV)) obtained or planned with dates obtained or planned; | See NOx Control Plan. |
| 44d | The results of emissions tests and annual average CEMS or PEMs data (in ppmvd at 3% O2, lbs/mmBTU) conducted pursuant to Paragraph 47 and tons per year; and | No annual emission tests or CEMS or PEMs data was required in this reporting period. |
| 44e | The amount in tons per year applied or to be applied toward satisfying Paragraph 42. | See NOx Control Plan. |
| 217a | NOx emissions in tons per year for each heater and boiler greater than 40 mmBTU/hr maximum fired duty; | See emission summary included in this section. |
| 217b | NOx emissions in tons per year as a sum for all heaters and boilers less than 40 mmBTU/hr maximum fired duty; | See emission summary included in this section. |
| 217c | SO2, CO and PM emissions in tons per year as a sum for all heaters and boilers; | See emission summary included in this section. |
| 218a | for operating units emissions limits that are required by this Consent Decree and monitored with CEMS, for each CEMS: | The NOx CEMS was certified 3/6/2014. The CEM data for Nox analyzer and the H2S analyzer on the fuel gas are attached. |

FR NOx Control Plan - 2013 Update

| Source | Maximum or Allowable Annual Heat Input Capacity mmBTU/hr (HHV) | 2003 Utilization Rate mmBTU/hr (HHV) | 2003 NOx Emission Rate lb/mmBTU | 2003 NOx Emissions tons/yr | 2004 Utilization Rate mmBTU/hr (HHV) | 2004 NOx Emission Rate lb/mmBTU | 2004 NOx Emissions tons/yr | 2003 - 2004 Average NOx Emissions tons/yr | Type of data used to derive emission estimate | Qualifying Controls Type date | Amount Applied to Paragraph 42 Requirement |
|--------------|---|---|------------------------------------|-------------------------------|---|------------------------------------|-------------------------------|--|---|----------------------------------|--|
| FR | | | | | | | | | | | |
| 21 | 200 | 148.5 | 0.031 | 23.4 | 162.7 | 0.031 | 21.43 | 22.4 | stack test | ULNB* | 0 |
| 23 | 40.1 | 33.6 | 0.043 | 14.39 | 32.6 | 0.043 | 5.42 | 9.9 | stack test | | |
| 34a | 188.9 | 119.5 | 0.22 | 113.02 | 107.1 | 0.22 | 138.01 | 125.5 | stack test | Shutdown 12/17/13 | 125.5 |
| 50 | 61.7 | 35.7 | 0.03 | 4.68 | 53.4 | 0.03 | 6.82 | 5.7 | stack test | | |
| 58 | 177.6 | 138.7 | 0.078 | 44.41 | 148.9 | 0.078 | 52.8 | 48.6 | CEMS | | |
| 59 | 177.8 | 140.3 | 0.081 | 53.79 | 149.0 | 0.081 | 58.24 | 56.0 | CEMS | | |
| Total | 843.9 | | | 253.68 | | | 282.52 | 268.1 | | | 125.5 |
| FEDRC | | | | | | | | | | | |
| B-105 | 361.00 | 121.2 | 0.2369 | 125.2 | 133.1 | 0.2468 | 143.9 | 134.6 | AP-42 | | |
| B-107 | 233.00 | 114.6 | 0.2000 | 100.4 | 107.3 | 0.2000 | 94.0 | 97.2 | Stack Test | | |
| B-2306 | 184.00 | 136.8 | 0.0530 | 31.8 | 145.9 | 0.0530 | 33.9 | 32.8 | Stack Test | | |
| B-301 | 175.10 | 169.9 | 0.3090 | 229.9 | 183.0 | 0.3090 | 220.6 | 225.3 | Stack Test | Shutdown 03/31/08 | 225.3 |
| B-304 | 170.40 | 147.5 | 0.3090 | 199.6 | 153.9 | 0.3090 | 208.3 | 204.0 | Stack Test | Shutdown 03/31/08 | 204.0 |
| B-108 | 148.40 | 85.4 | 0.0720 | 26.9 | 85.5 | 0.0720 | 27.0 | 26.9 | Stack Test | | |
| B-2601 | 97.00 | 68.2 | 0.1200 | 35.8 | 72.9 | 0.1200 | 38.3 | 37.1 | Permit Limit | Shutdown 12/31/12 | |
| B-2104 | 86.53 | 31.8 | 0.0841 | 11.7 | 43.4 | 0.0879 | 16.7 | 14.2 | AP-42 | | |
| B-2901 | 79.00 | 25.7 | 0.0855 | 9.8 | 23.6 | 0.0889 | 9.2 | 9.4 | AP-42 | | |
| B-2401 | 74.70 | 74.2 | 0.3090 | 100.4 | 85.9 | 0.3090 | 116.3 | 108.3 | Stack Test | Shutdown 03/31/08 | 108.3 |
| B-3501 | 73.70 | 60.7 | 0.0100 | 2.7 | 65.9 | 0.0100 | 2.9 | 2.8 | Permit Limit | SCR 02/28/11 | |
| B-1002 | 72.50 | 37.1 | 0.0830 | 13.5 | 34.8 | 0.0878 | 13.4 | 13.4 | AP-42 | ULNB** 11/12/09 | 0.0 |
| B-2108 | 72.50 | 56.8 | 0.0842 | 20.9 | 55.3 | 0.0878 | 21.3 | 21.1 | AP-42 | | |
| B-1001 | 70.00 | 45.9 | 0.0829 | 16.7 | 48.5 | 0.0879 | 18.7 | 17.7 | AP-42 | | |
| B-140 | 69.00 | 29.0 | 0.0851 | 10.8 | 21.7 | 0.0880 | 8.4 | 9.6 | AP-42 | | |
| B-2105 | 59.27 | 29.4 | 0.0841 | 10.8 | 34.8 | 0.0877 | 13.4 | 12.1 | AP-42 | | |
| B-2607 | 57.50 | 25.6 | 0.0841 | 9.4 | 23.2 | 0.0885 | 9.0 | 9.2 | AP-42 | Shutdown 12/31/12 | |
| B-2503 | 43.00 | 28.8 | 0.0839 | 10.6 | 28.9 | 0.0881 | 10.4 | 10.5 | AP-42 | | |
| B-2001 | 54.00 | 31.7 | 0.0840 | 11.7 | 35.2 | 0.0885 | 13.6 | 12.7 | AP-42 | | |
| B-3401 | 50.00 | 34.0 | 0.0669 | 10.0 | 33.1 | 0.0669 | 9.7 | 9.8 | Stack Test | | |
| B-2304 | 48.00 | 10.4 | 0.0823 | 3.8 | 10.2 | 0.0893 | 4.0 | 3.9 | AP-42 | | |
| B-2006 | 48.50 | 33.3 | 0.0841 | 12.3 | 32.7 | 0.0885 | 12.7 | 12.5 | AP-42 | | |
| B-2602 | 45.40 | 38.3 | 0.0849 | 14.2 | 39.2 | 0.0889 | 15.3 | 14.7 | AP-42 | | |
| Total | 2,370.50 | | | 1,018.7 | | | 1,060.7 | 1,039.7 | | | 537.6 |

** Controls installed prior to CD and only utilized for Paragraph 46 compliance. CEMS required to be installed by 12/31/2013. The CEMS was installed prior to the deadline as required.

* Performance testing required under Paragraph 47c was conducted on April 26, 2011

| Paragraph 42 NOx Reductions - FEDRC & FRI Combined | | | |
|--|-----------------|---|-----------|
| Total Required NOx Reductions by December 31, 2013 | 649 tpy | Reduction achieved by December 31, 2009 | 537.6 tpy |
| Two-Thirds Reduction by December 31, 2009 | 432 tpy | Reduction planned by December 31, 2013 | 663.1 tpy |
| Paragraph 46 NOx Control Requirements - FRI | | | |
| 30% of maximum heat capacity | 253.17 mmBTU/hr | | |
| Control already achieved or planned | 386.9 mmBTU/hr | | |
| Amount left to achieve (undefined) | 0 mmBTU/hr | | |

Attachment D - HEATERS & BOILERS

P217a - Emission Summary Each Heaters & Boilers >40 MMBTU/hr

| Unit | Size | NOx Emissions | Method of Determination |
|------|----------|---------------|-------------------------|
| | MMBtu/hr | tons/yr | |
| 21 | 202 | 18.45 | Source Test |
| 23 | 54 | 2.91 | Source Test |
| 34A | 187 | 79.22 | Source Test |
| 50 | 62 | 12.62 | Source Test |
| 58 | 178 | 29.58 | CEMS Data |
| 59 | 178 | 35.56 | CEMS Data |
| 83* | 200 | 9.83 | CEMS Data |

*Boiler 83 was is not Included In the CD Appendix C, but is a heater at the source >40 MMBTU/hr

P217b - Emission Summary All Heaters & Boilers <40 MM BTU/hr

| | 2012 Actual Emissions | Method of Determination |
|-----|-----------------------|-------------------------|
| | tons/yr | |
| NOx | 96.26 | Emission Factor |

P217C - Emission Summary All Heaters & Boilers

| | 2012 Actual Emissions | Method of Determination |
|-----|-----------------------|-------------------------|
| | tons/yr | |
| PM | 11.05 | Emission Factors |
| SO2 | 14.27 | H2S CEM |
| CO | 156.03 | Emission Factors |

1Q14

DEPARTMENT OF ENVIRONMENTAL QUALITY
AIR QUALITY DIVISION
CONTINUOUS EMISSION MONITORING REPORT

FORM A

I. GENERAL INFORMATION

- A. Facility Name: FRONTIER REFINING LLC
B. Process Unit/Pollutant Monitored: H₂S MONITOR - #3 AMINE TREATER (ALL FUEL GAS PROCESSING UNITS)
C. Applicable Permit Number or Regulation: 3-0-149-2
D. Applicable Emission Limit: 162 ppm H₂S (0.1 gr/scf) 3-hour average

II. MONITOR INFORMATION

- A. Date of Original Monitor Installation: December 1978 (Replaced October 29, 2013)
B. Date of Latest Monitor Certification: December 31, 2013

C. Pollutant/Opacity Monitor

1. Manufacturer: ABB Inc.
2. Model Number: PGC5000
3. Serial Number Main Chassis: 867521
4. Basis of Measurement (If Applicable - Wet or Dry): Wet
5. Instrument Span, Range Value (Specify Units): 0 - 320 ppm H₂S

D. Diluent Monitor

1. Type of Monitor: O₂ or CO₂ (circle one): NONE
2. Manufacturer:
3. Model Number:
4. Serial Number Main Chassis:
5. Basis of Measurement (If Applicable - Wet or Dry):
6. Instrument Span, Range Value (Specify Units): _____

E. Flow Monitor

1. Type of Instrument (i.e. S-type Pitot Tube): NONE
2. Manufacturer:
3. Model Number: _____
4. Serial Number Main Chassis:

F. Quality Assurance Data

1. QA Plan Date: January 18, 2013
2. QA Plan Approval Date: August 29, 2013

III. Operating/Monitoring Data

A. Quarter: 1 Year: 2014

B Total Hours in Reporting Period: 2160

C. Hours Unit Operated During the Reporting Period: 2160

Note: Include all unit operating time for the quarter including operating time associated with Startup/Shutdown and Chapter 1 Section 5 (Emergency/Abnormal) Operations. Report time in hours to one decimal place, i.e. 1902.8.

IV. Quarterly Audits/Monitoring System Modifications

A. Quarterly Audits

Type Audit: CGA

| | | |
|----------------------------|-----------------------|-------------|
| | <u>Date Conducted</u> | <u>Pass</u> |
| Pollutant/Opacity Monitor: | <u>3/24/2014</u> | <u>YES</u> |
| Diluent Monitor | | |

B. Equipment Replaced During Reporting Period: Replaced Compressed Air Bottle.

Note: Only equipment replacements or modifications to the system that could affect the ability of the continuous monitoring system to comply with the associated Performance Specification shall be reported.

V. Report Contact

A. Name: David Weeks, Environmental Engineer

B. Phone Number: (307) 771-8827

1Q14

EXCESS EMISSION SUMMARY REPORT**Fuel Gas H₂S CEMS****3-hr average ppm = 162 ppm****FORM B**

| Emission Data Summary | | CMS Performance Report | |
|--|-------------|---|--------------|
| I. Duration of Excess Emission in Reporting Period Due to: | | I. CMS Downtime in Reporting Period Due to: | |
| A. Startup/Shutdown | 25.0 | A. Monitor Equipment Malfunction | 2.0 |
| B. Control Equipment Problems | 0.0 | B. Non-Monitor Equipment Malfunctions | 0.0 |
| C. Process Problem | 11.0 | C. Quality Assurance Calibration | 1.0 |
| D. Other Known Causes | 0.0 | D. Other Known Causes | 190.0 |
| E. Unknown Causes | 0.0 | E. Unknown Causes | 0.0 |
| II. Total Duration of Excess Emission | 36.0 | II. Total CMS Downtime | 193.0 |
| III. Total Duration of Excess Emissions x 100 divided by Total Source Operating Time minus Total CMS Downtime | 1.7% | III. Total CMS Downtime x 100 divided by Total Source Operating Time | 8.9% |

Total time of excess emission events due to emergency/abnormal operations: 0.

NOTE:

1. Only report excess emissions which occur when the unit/process is operating. Include all excess emissions in the Emission Data Summary including those excess emissions associated with startup/shutdown and those excess emissions associated with Chapter 1 Section 5 (Emergency/Abnormal) operations. Report times in hours for gaseous monitors and in tenths of an hour for opacity monitors. Include detailed excess emission information and causes in the Excess Emission Table (Form C).
2. Only report CEM downtime which occurs while the unit/process is operating. Report time in hours to one decimal point. Include detailed CEM downtime and causes in the Monitor Outage Table (Form D).
3. Include an explanation of what corrective actions were taken for total excess emissions or monitor downtime for the quarter (Emission Data Summary and CMS Performance Summary, Item III) greater than 5%. (See Instructions for further details.)

1Q14 Fuel Gas CEMS

H₂S ppm

3-Hour Rolling Average

Form C - Excess Summary

Fuel Gas H2S Excess Emissions Summary
Frontier Refining LLC
H2S ppm 3-Hr Rolling Excess Emissions for 1/1/2014 thru 3/31/2014

| Reason | Duration |
|---|-----------------|
| H2S ppm 3-Hour Rolling Average Emission Exceedance - Lost all Boilers - All Units Shutdown | 9 hours |
| H2S PPM 3-Hour Rolling Average Exceedance - Start-Up Issues | 16 hours |
| Process Upset - Amine Unit - High Regen level and slumped Reboiler | 3 hours |
| Sour Water Stripper (SWS) shutdown due to the loss of Boiler #3 | 2 hours |
| SRU #2 shut down three times during the shift, the last shutdown lasted three hours due to the stackmatch would not light. This resulted in high H2S in the fuel gas. | 6 hours |
| <hr/> | |
| Total duration of H2S ppm 3-Hr Rolling excess emissions | 36 hours |
| Total operating time | 2160 hours |
| Operating time with excess emissions | 1.7% |

Fuel Gas H2S Excess Emissions

Frontier Refining LLC

H2S ppm 3-Hr Rolling Excess Emissions for 1/1/2014 thru 3/31/2014

| Parameter | Start | End | Duration | Value | Min | Max | Limit | Reason | Action |
|----------------------|--------------------|----------|----------|-------|-------|-------|-------|---|---|
| H2S ppm 3-Hr Rolling | 1/23/2014 8:00 PM | 9:59 PM | 2 hours | 180.0 | 174.5 | 185.4 | 163 | Sour Water Stripper (SWS) shutdown due to the loss of Boiler #3 | Restarted SWS. |
| H2S ppm 3-Hr Rolling | 1/31/2014 10:00 AM | 3:59 PM | 6 hours | 291.7 | 234.9 | 320.0 | 163 | SRU #2 shut down three times during the shift, the last shutdown lasted three hours due to the stackmatch would not light. This resulted in high H2S in the fuel gas. | Reduced rate in the plant for sulfur containment, I&E worked on the stackmatch. |
| H2S ppm 3-Hr Rolling | 2/5/2014 10:00 AM | 6:59 PM | 9 hours | 299.8 | 200.2 | 320.0 | 163 | H2S ppm 3-Hour Rolling Average Emission Exceedance - Lost all Boilers - All Units Shutdown | Units Shutdown |
| H2S ppm 3-Hr Rolling | 2/8/2014 12:00 AM | 11:59 AM | 12 hours | 298.0 | 226.6 | 320.0 | 163 | H2S PPM 3-Hour Rolling Average Exceedance - Start-Up Issues | Adjusted Unit Operations |
| H2S ppm 3-Hr Rolling | 2/8/2014 3:00 PM | 6:59 PM | 4 hours | 258.9 | 245.7 | 269.5 | 163 | H2S PPM 3-Hour Rolling Average Exceedance - Start-Up Issues | Adjusted Unit Operations |
| H2S ppm 3-Hr Rolling | 3/19/2014 4:00 AM | 6:59 AM | 3 hours | 217.7 | 191.9 | 259.5 | 163 | Process Upset - Amine Unit - High Regen level and slumped Reboiler | Regained control of Regen level and Reboiler |
| Total duration | | | 36 hours | | | | | | |

1Q14 Fuel Gas CEMS

H₂S ppm

Form D - Downtime Summary

Fuel Gas H2S CEMS Downtime Summary

Frontier Refining LLC

H2S ppm CEMS Downtime for 1/1/2014 thru 3/31/2014

| Reason | Duration |
|---|-------------------|
| Cylinder Gas Audit (CGA) | 1 hour |
| Failed Morning H2S Span Calibration Check - Low Instrument Air Pressure | 25 hours |
| Failed Morning H2S Span Calibration Check - Low Instrument air pressure had caused analyzer to shut down | 3 hours |
| Failed Morning H2S Span Calibration Check; Failed Manual Calibration | 2 hours |
| H2S Analyzer Malfunction - Low Instrument Air Pressure | 15 hours |
| Maintenance - Analyzer | 1 hour |
| Sample System Malfunction - Low Instrument Air Pressure | 146 hours |
| Total duration of H2S ppm CEMS downtime | 193 hours |
| Total operating time | 2160 hours |
| Operating time with CEMS downtime | 8.9% |

Fuel Gas H2S CEMS Downtime
Frontier Refining LLC
H2S ppm CEMS Downtime for 1/1/2014 thru 3/31/2014

| Parameter | Start | End | Duration | Reason | Action |
|-----------|--------------------|----------|----------|--|--|
| H2S ppm | 1/17/2014 10:00 AM | 10:59 AM | 1 hour | Maintenance - Analyzer | Ran validations and calibrations on fuel gas analyzer |
| H2S ppm | 2/5/2014 7:00 AM | 7:59 AM | 1 hour | Sample System Malfunction - Low Instrument Air Pressure | Self Corrected - Instrument Air Pressure Increased |
| H2S ppm | 2/5/2014 9:00 PM | 9:59 PM | 1 hour | Sample System Malfunction - Low Instrument Air Pressure | Self Corrected - Instrument Air Pressure Increased |
| H2S ppm | 2/8/2014 12:00 PM | 12:59 PM | 1 hour | Sample System Malfunction - Low Instrument Air Pressure | Self Corrected - Instrument Air Pressure Increased |
| H2S ppm | 2/12/2014 4:00 PM | 4:59 PM | 1 hour | Sample System Malfunction - Low Instrument Air Pressure | Self Corrected - Instrument Air Pressure Increased |
| H2S ppm | 2/13/2014 10:00 AM | 10:59 AM | 1 hour | Sample System Malfunction - Low Instrument Air Pressure | Self Corrected - Instrument Air Pressure Increased |
| H2S ppm | 2/13/2014 2:00 PM | 2:59 PM | 1 hour | Sample System Malfunction - Low Instrument Air Pressure | Self Corrected - Instrument Air Pressure Increased |
| H2S ppm | 2/13/2014 5:00 PM | 7:59 PM | 3 hours | Sample System Malfunction - Low Instrument Air Pressure | Self Corrected - Instrument Air Pressure Increased |
| H2S ppm | 2/13/2014 9:00 PM | 11:59 PM | 3 hours | Sample System Malfunction - Low Instrument Air Pressure | Self Corrected - Instrument Air Pressure Increased |
| H2S ppm | 2/14/2014 1:00 AM | 1:59 AM | 1 hour | Sample System Malfunction - Low Instrument Air Pressure | Self Corrected - Instrument Air Pressure Increased |
| H2S ppm | 2/14/2014 8:00 AM | 10:59 AM | 3 hours | Sample System Malfunction - Low Instrument Air Pressure | Self Corrected - Instrument Air Pressure Increased |
| H2S ppm | 2/17/2014 2:00 PM | 2:59 PM | 1 hour | Sample System Malfunction - Low Instrument Air Pressure | Self Corrected - Instrument Air Pressure Increased |
| H2S ppm | 2/18/2014 3:00 AM | 4:59 AM | 2 hours | Sample System Malfunction - Low Instrument Air Pressure | Self Corrected - Instrument Air Pressure Increased |
| H2S ppm | 2/18/2014 8:00 AM | 8:59 AM | 1 hour | Sample System Malfunction - Low Instrument Air Pressure | Self Corrected - Instrument Air Pressure Increased |
| H2S ppm | 2/18/2014 6:00 PM | 10:59 PM | 5 hours | Sample System Malfunction - Low Instrument Air Pressure | Self Corrected - Instrument Air Pressure Increased |
| H2S ppm | 2/19/2014 2:00 AM | 5:59 AM | 4 hours | Sample System Malfunction - Low Instrument Air Pressure | Self Corrected - Instrument Air Pressure Increased |
| H2S ppm | 2/19/2014 6:00 AM | 8:59 AM | 3 hours | Failed Morning H2S Span Calibration Check - Low instrument air pressure had caused analyzer to shut down | When instrument air pressure had returned to normal, another validation check was ran. Analyzer passed span check. |

| Parameter | Start | End | Duration | Reason | Action |
|-----------|--------------------|----------|----------|---|--|
| H2S ppm | 2/21/2014 11:00 AM | 1:59 PM | 3 hours | Sample System Malfunction - Low Instrument Air Pressure | Self Corrected - Instrument Air Pressure Increased |
| H2S ppm | 2/22/2014 4:00 PM | 4:59 PM | 1 hour | Sample System Malfunction - Low Instrument Air Pressure | Self Corrected - Instrument Air Pressure Increased |
| H2S ppm | 2/23/2014 9:00 PM | 10:59 PM | 2 hours | Sample System Malfunction - Low Instrument Air Pressure | Self Corrected - Instrument Air Pressure Increased |
| H2S ppm | 2/25/2014 2:00 AM | 5:59 AM | 4 hours | Sample System Malfunction - Low Instrument Air Pressure | Self Corrected - Instrument Air Pressure Increased |
| H2S ppm | 2/25/2014 7:00 AM | 8:59 AM | 2 hours | Sample System Malfunction - Low Instrument Air Pressure | Self Corrected - Instrument Air Pressure Increased |
| H2S ppm | 2/25/2014 3:00 PM | 11:59 PM | 9 hours | Sample System Malfunction - Low Instrument Air Pressure | Self Corrected - Instrument Air Pressure Increased |
| H2S ppm | 2/26/2014 12:00 AM | 12:59 AM | 1 hour | Sample System Malfunction - Low Instrument Air Pressure | Self Corrected - Instrument Air Pressure Increased |
| H2S ppm | 2/26/2014 2:00 AM | 3:59 AM | 2 hours | Sample System Malfunction - Low Instrument Air Pressure | Self Corrected - Instrument Air Pressure Increased |
| H2S ppm | 2/26/2014 7:00 AM | 7:59 AM | 1 hour | Sample System Malfunction - Low Instrument Air Pressure | Self Corrected - Instrument Air Pressure Increased |
| H2S ppm | 2/26/2014 2:00 PM | 10:59 PM | 9 hours | Sample System Malfunction - Low Instrument Air Pressure | Self Corrected - Instrument Air Pressure Increased |
| H2S ppm | 2/27/2014 9:00 AM | 9:59 AM | 1 hour | Sample System Malfunction - Low Instrument Air Pressure | Self Corrected - Instrument Air Pressure Increased |
| H2S ppm | 2/27/2014 11:00 AM | 11:59 AM | 1 hour | Sample System Malfunction - Low Instrument Air Pressure | Self Corrected - Instrument Air Pressure Increased |
| H2S ppm | 2/27/2014 4:00 PM | 4:59 PM | 1 hour | Sample System Malfunction - Low Instrument Air Pressure | Self Corrected - Instrument Air Pressure Increased |
| H2S ppm | 2/27/2014 6:00 PM | 8:59 PM | 3 hours | Sample System Malfunction - Low Instrument Air Pressure | Self Corrected - Instrument Air Pressure Increased |
| H2S ppm | 2/27/2014 11:00 PM | 11:59 PM | 1 hour | Sample System Malfunction - Low Instrument Air Pressure | Self Corrected - Instrument Air Pressure Increased |
| H2S ppm | 2/28/2014 7:00 AM | 4:59 PM | 10 hours | Sample System Malfunction - Low Instrument Air Pressure | Self Corrected - Instrument Air Pressure Increased |
| H2S ppm | 2/28/2014 7:00 PM | 8:59 PM | 2 hours | Sample System Malfunction - Low Instrument Air Pressure | Self Corrected - Instrument Air Pressure Increased |
| H2S ppm | 2/28/2014 10:00 PM | 11:59 PM | 2 hours | Sample System Malfunction - Low Instrument Air Pressure | Self Corrected - Instrument Air Pressure Increased |
| H2S ppm | 3/1/2014 12:00 AM | 1:59 AM | 2 hours | Sample System Malfunction - Low Instrument Air Pressure | Self Corrected - Instrument Air Pressure Increased |
| H2S ppm | 3/1/2014 3:00 AM | 5:59 AM | 3 hours | Sample System Malfunction - Low Instrument Air Pressure | Self Corrected - Instrument Air Pressure Increased |

| Parameter | Start | End | Duration | Reason | Action |
|-----------|-------------------|----------|----------|---|--|
| H2S ppm | 3/1/2014 6:00 AM | 12:59 PM | 7 hours | Failed Morning H2S Span Calibration Check - Low Instrument Air Pressure | Self Corrected - Instrument Air Pressure Increased |
| H2S ppm | 3/1/2014 1:00 PM | 1:59 PM | 1 hour | Sample System Malfunction - Low Instrument Air Pressure | Self Corrected - Instrument Air Pressure Increased |
| H2S ppm | 3/1/2014 2:00 PM | 11:59 PM | 10 hours | H2S Analyzer Malfunction - Low Instrument Air Pressure | Self Corrected - Instrument Air Pressure Increased |
| H2S ppm | 3/2/2014 12:00 AM | 1:59 AM | 2 hours | H2S Analyzer Malfunction - Low Instrument Air Pressure | Self Corrected - Instrument Air Pressure Increased |
| H2S ppm | 3/2/2014 2:00 AM | 2:59 AM | 1 hour | Sample System Malfunction - Low Instrument Air Pressure | Self Corrected - Instrument Air Pressure Increased |
| H2S ppm | 3/2/2014 3:00 AM | 5:59 AM | 3 hours | H2S Analyzer Malfunction - Low Instrument Air Pressure | Self Corrected - Instrument Air Pressure Increased |
| H2S ppm | 3/5/2014 5:00 AM | 5:59 AM | 1 hour | Sample System Malfunction - Low Instrument Air Pressure | Self Corrected - Instrument Air Pressure Increased |
| H2S ppm | 3/5/2014 8:00 AM | 9:59 AM | 2 hours | Failed Morning H2S Span Calibration Check; Failed Manual Calibration | Ran an Additional Manual Calibration |
| H2S ppm | 3/7/2014 6:00 AM | 6:59 AM | 1 hour | Failed Morning H2S Span Calibration Check - Low Instrument Air Pressure | Ran Manual Calibration |
| H2S ppm | 3/7/2014 3:00 PM | 8:59 PM | 6 hours | Sample System Malfunction - Low Instrument Air Pressure | Self Corrected - Instrument Air Pressure Increased |
| H2S ppm | 3/7/2014 10:00 PM | 11:59 PM | 2 hours | Sample System Malfunction - Low Instrument Air Pressure | Self Corrected - Instrument Air Pressure Increased |
| H2S ppm | 3/8/2014 12:00 AM | 5:59 AM | 6 hours | Sample System Malfunction - Low Instrument Air Pressure | Self Corrected - Instrument Air Pressure Increased |
| H2S ppm | 3/8/2014 7:00 AM | 8:59 AM | 2 hours | Failed Morning H2S Span Calibration Check - Low Instrument Air Pressure | Ran Manual Calibration |
| H2S ppm | 3/8/2014 12:00 PM | 2:59 PM | 3 hours | Sample System Malfunction - Low Instrument Air Pressure | Self Corrected - Instrument Air Pressure Increased |
| H2S ppm | 3/8/2014 7:00 PM | 11:59 PM | 5 hours | Sample System Malfunction - Low Instrument Air Pressure | Self Corrected - Instrument Air Pressure Increased |
| H2S ppm | 3/9/2014 12:00 AM | 3:59 AM | 4 hours | Sample System Malfunction - Low Instrument Air Pressure | Self Corrected - Instrument Air Pressure Increased |
| H2S ppm | 3/9/2014 6:00 AM | 5:59 PM | 12 hours | Failed Morning H2S Span Calibration Check - Low Instrument Air Pressure | Ran Manual Calibration |
| H2S ppm | 3/9/2014 6:00 PM | 11:59 PM | 6 hours | Sample System Malfunction - Low Instrument Air Pressure | Self Corrected - Instrument Air Pressure Increased |

| Parameter | Start | End | Duration | Reason | Action |
|----------------|--------------------|----------|-----------|---|--|
| H2S ppm | 3/10/2014 2:00 AM | 5:59 AM | 4 hours | Sample System Malfunction - Low Instrument Air Pressure | Self Corrected - Instrument Air Pressure Increased |
| H2S ppm | 3/10/2014 8:00 AM | 3:59 PM | 8 hours | Sample System Malfunction - Low Instrument Air Pressure | Self Corrected - Instrument Air Pressure Increased |
| H2S ppm | 3/10/2014 6:00 PM | 7:59 PM | 2 hours | Sample System Malfunction - Low Instrument Air Pressure | Self Corrected - Instrument Air Pressure Increased |
| H2S ppm | 3/10/2014 10:00 PM | 11:59 PM | 2 hours | Sample System Malfunction - Low Instrument Air Pressure | Self Corrected - Instrument Air Pressure Increased |
| H2S ppm | 3/11/2014 12:00 AM | 5:59 AM | 6 hours | Sample System Malfunction - Low Instrument Air Pressure | Self Corrected - Instrument Air Pressure Increased |
| H2S ppm | 3/11/2014 6:00 AM | 8:59 AM | 3 hours | Failed Morning H2S Span Calibration Check - Low Instrument Air Pressure | Ran Manual Calibration |
| H2S ppm | 3/24/2014 12:00 PM | 12:59 PM | 1 hour | Cylinder Gas Audit (CGA) | Performed H2S CGA |
| Total duration | | | 193 hours | | |

1Q14 Fuel Gas

H₂S ppm

Monthly Average Summary

Frontier Refining LLC
Cheyenne, WY
Fuel Gas H2S Monthly Average - Summary
2014 Q1

| Month | H2S ppm Monthly |
|---------------|--------------------|
| January 2014 | 20.2 |
| February 2014 | 25.9 |
| March 2014 | 8.2 |

Data Sheet for Fuel Gas CEM System Cylinder Gas Audit

1. Date Audit Commenced: 24-Mar-14 Time Audit Commenced: 12:45PM

2. Audit Gases Used for CGA (All gases to be Protocol 1 Certified):

| Acceptable Audit Gas Ranges | Cylinder Number and Expiration Date | Audit Gas Concentrations | | +/- of Audit Gas Range |
|--|-------------------------------------|--------------------------|-----|------------------------|
| H ₂ S Low: 100 - 150 PPM | SG9200120 | 76.38 | PPM | 15.28% |
| | 26-Oct-14 | | | |
| H ₂ S Mid: 250 - 300 PPM | CC3831 | 159.30 | PPM | 31.86% |
| | 23-Mar-13 | | | |

3. CEM System Response:

| | Low-Span H ₂ S PPM | | Mid-Span H ₂ S PPM | |
|------------------------|-------------------------------|---------|-------------------------------|---------|
| | Analyzer | CISCO | Analyzer | CISCO |
| Run 1 | 69.21 | N/A | 155.90 | N/A |
| Run 2 | 70.07 | N/A | 156.94 | N/A |
| Run 3 | 70.20 | N/A | 157.93 | N/A |
| Avg. (d _m) | 69.83 | #DIV/0! | 156.92 | #DIV/0! |
| A | 8.58 | #DIV/0! | 1.49 | #DIV/0! |
| Pass? | Yes | #DIV/0! | Yes | #DIV/0! |

4. Signature of Technician(s) performing CGA:


Matt Hobbs, Kevin Marschner and/or Tad Milliken

Calculation of A:

$$A = (d_m - c_a) / c_a \times 100$$

A must be +/-15% to pass.

where:

A = accuracy of CEM

d_m = average of responses

c_a = certified audit value of gas

2Q14

DEPARTMENT OF ENVIRONMENTAL QUALITY
AIR QUALITY DIVISION
CONTINUOUS EMISSION MONITORING REPORT

FORM A

I. GENERAL INFORMATION

- A. Facility Name: FRONTIER REFINING LLC
B. Process Unit/Pollutant Monitored: H₂S MONITOR - #3 AMINE TREATER (ALL FUEL GAS PROCESSING UNITS)
C. Applicable Permit Number or Regulation: 3-0-149-2
D. Applicable Emission Limit: 162 ppm H₂S (0.1 gr/scf) 3-hour average

II. MONITOR INFORMATION

- A. Date of Original Monitor Installation: December 1978 (Replaced October 29, 2013)
B. Date of Latest Monitor Certification: December 31, 2013

C. Pollutant/Opacity Monitor

1. Manufacturer: ABB Inc.
2. Model Number: PGC5000
3. Serial Number Main Chassis: 867521
4. Basis of Measurement (If Applicable - Wet or Dry): Wet
5. Instrument Span, Range Value (Specify Units): 0 - 320 ppm H₂S

D. Diluent Monitor

1. Type of Monitor: O₂ or CO₂ (circle one): NONE
2. Manufacturer:
3. Model Number:
4. Serial Number Main Chassis
5. Basis of Measurement (If Applicable - Wet or Dry):
6. Instrument Span, Range Value (Specify Units): _____

E. Flow Monitor

1. Type of Instrument (i.e. S-type Pitot Tube): NONE
2. Manufacturer:
3. Model Number: _____
4. Serial Number Main Chassis:

F. Quality Assurance Data

1. QA Plan Date: January 18, 2013
2. QA Plan Approval Date: August 29, 2013

III. Operating/Monitoring Data

A. Quarter: 2 Year: 2014

B Total Hours in Reporting Period: 2184

C. Hours Unit Operated During the Reporting Period: 2184

Note: Include all unit operating time for the quarter including operating time associated with Startup/Shutdown and Chapter 1 Section 5 (Emergency/Abnormal) Operations. Report time in hours to one decimal place, i.e. 1902.8.

IV. Quarterly Audits/Monitoring System Modifications

A. Quarterly Audits

Type Audit: CGA

| | | |
|----------------------------|-----------------------|-------------|
| | <u>Date Conducted</u> | <u>Pass</u> |
| Pollutant/Opacity Monitor: | <u>6/3/2014</u> | <u>YES</u> |
| Diluent Monitor | | |

B. Equipment Replaced During Reporting Period: Installed new dedicated Instrument Air line.

Note: Only equipment replacements or modifications to the system that could affect the ability of the continuous monitoring system to comply with the associated Performance Specification shall be reported.

V. Report Contact

A. Name: David Weeks, Environmental Engineer

B. Phone Number: (307) 771-8827

2Q14

EXCESS EMISSION SUMMARY REPORT**Fuel Gas H₂S CEMS****3-hr average ppm = 162 ppm****FORM B**

| Emission Data Summary | | CMS Performance Report | |
|--|-------------|---|-------------|
| I. Duration of Excess Emission in Reporting Period Due to: | | I. CMS Downtime in Reporting Period Due to: | |
| A. Startup/Shutdown | 0.0 | A. Monitor Equipment Malfunction | 2.0 |
| B. Control Equipment Problems | 0.0 | B. Non-Monitor Equipment Malfunctions | 18.0 |
| C. Process Problem | 11.0 | C. Quality Assurance Calibration | 0.0 |
| D. Other Known Causes | 0.0 | D. Other Known Causes | 2.0 |
| E. Unknown Causes | 0.0 | E. Unknown Causes | 0.0 |
| II. Total Duration of Excess Emission | 11.0 | II. Total CMS Downtime | 22.0 |
| III. Total Duration of Excess Emissions x 100 divided by Total Source Operating Time minus Total CMS Downtime | 0.5% | III. Total CMS Downtime x 100 divided by Total Source Operating Time | 1.0% |

Total time of excess emission events due to emergency/abnormal operations: 0.

NOTE:

1. Only report excess emissions which occur when the unit/process is operating. Include all excess emissions in the Emission Data Summary including those excess emissions associated with startup/shutdown and those excess emissions associated with Chapter 1 Section 5 (Emergency/Abnormal) operations. Report times in hours for gaseous monitors and in tenths of an hour for opacity monitors. Include detailed excess emission information and causes in the Excess Emission Table (Form C).
2. Only report CEM downtime which occurs while the unit/process is operating. Report time in hours to one decimal point. Include detailed CEM downtime and causes in the Monitor Outage Table (Form D).
3. Include an explanation of what corrective actions were taken for total excess emissions or monitor downtime for the quarter (Emission Data Summary and CMS Performance Summary, Item III) greater than 5%. (See Instructions for further details.)

Fuel Gas H2S Excess Emissions Summary

Frontier Refining LLC

H2S ppm 3-Hr Rolling Excess Emissions for 4/1/2014 thru 6/30/2014

| Reason | Duration |
|---|-----------------|
| Amine treater had a couple upsets during the day which resulted in high H2S in the fuel gas. | 2 hours |
| High H2S in fuel gas. There was low level in #3 amine. The regenerator lost flow from #3 amine. | 3 hours |
| Process Upset - Result of Prior Upsets caused by Boilers #1 & #2 Shutdown | 4 hours |
| Treater bounced causing high H2S levels in the fuel gas. | 2 hours |
| <hr/> | |
| Total duration of H2S ppm 3-Hr Rolling excess emissions | 11 hours |
| Total operating time | 2184 hours |
| Operating time with excess emissions | 0.5% |

Comment: Form C - Excess Emissions Summary

Fuel Gas H2S Excess Emissions

Frontier Refining LLC

H2S ppm 3-Hr Rolling Excess Emissions for 4/1/2014 thru 6/30/2014

| Parameter | Start | End | Duration | Value | Min | Max | Limit | Reason | Action |
|----------------------|--------------------|----------|----------|-------|-------|-------|-------|---|---|
| H2S ppm 3-Hr Rolling | 4/1/2014 8:00 AM | 10:59 AM | 3 hours | 183.9 | 171.3 | 207.2 | 163 | High H2S in fuel gas. There was low level in #3 amine. The regenerator lost flow from #3 amine. | Operators transferred amine from #4 amine sump to #3 amine to get the level back. |
| H2S ppm 3-Hr Rolling | 4/1/2014 7:00 PM | 8:59 PM | 2 hours | 187.6 | 179.4 | 195.8 | 163 | Treater bounced causing high H2S levels in the fuel gas. | Adjusted Process. |
| H2S ppm 3-Hr Rolling | 4/2/2014 1:00 PM | 2:59 PM | 2 hours | 214.7 | 206.9 | 222.4 | 163 | Amine treater had a couple upsets during the day which resulted in high H2S in the fuel gas. | Operators back flushed coolers, steam was added, and the flow increased. |
| H2S ppm 3-Hr Rolling | 6/14/2014 12:00 AM | 3:59 AM | 4 hours | 220.0 | 167.9 | 269.3 | 163 | Process Upset - Result of Prior Upsets caused by Boilers #1 & #2 Shutdown | Adjusted Unit Operation |
| Total duration | | | 11 hours | | | | | | |

Comment: Form C - Excess Emissions Summary

Fuel Gas H2S CEMS Downtime Summary

Frontier Refining LLC

H2S ppm CEMS Downtime for 4/1/2014 thru 6/30/2014

| Reason | Duration |
|---|-----------------|
| Fuel gas analyzer failed validation due to low instrument air pressure. | 2 hours |
| Maintenance - Shut down H2S analyzer to install a new dedicated air line. | 2 hours |
| Sample System Malfunction - Low Instrument Air Pressure | 18 hours |
| <hr/> | |
| Total duration of H2S ppm CEMS downtime | 22 hours |
| Total operating time | 2184 hours |
| Operating time with CEMS downtime | 1.0% |

Comment: Form D - Downtime Summary

Fuel Gas H2S CEMS Downtime
Frontier Refining LLC
H2S ppm CEMS Downtime for 4/1/2014 thru 6/30/2014

| Parameter | Start | End | Duration | Reason | Action |
|----------------|--------------------|----------|----------|---|--|
| H2S ppm | 4/7/2014 6:00 AM | 9:59 AM | 4 hours | Sample System Malfunction - Low Instrument Air Pressure | Self Corrected - Instrument Air Pressure Increased |
| H2S ppm | 4/11/2014 9:00 AM | 10:59 AM | 2 hours | Sample System Malfunction - Low Instrument Air Pressure | Self Corrected - Instrument Air Pressure Increased |
| H2S ppm | 4/14/2014 3:00 AM | 4:59 AM | 2 hours | Sample System Malfunction - Low Instrument Air Pressure | Self Corrected - Instrument Air Pressure Increased |
| H2S ppm | 4/17/2014 4:00 AM | 4:59 AM | 1 hour | Sample System Malfunction - Low Instrument Air Pressure | Self Corrected - Instrument Air pressure increased. |
| H2S ppm | 4/17/2014 5:00 AM | 8:59 AM | 2 hours | Fuel gas analyzer failed validation due to low instrument air pressure. | Ran calibration check. Instrument Air pressure increased. |
| H2S ppm | 4/23/2014 11:00 AM | 11:59 AM | 1 hour | Sample System Malfunction - Low Instrument Air Pressure | Self Corrected - Instrument Air Pressure Increased |
| H2S ppm | 5/3/2014 5:00 PM | 5:59 PM | 1 hour | Sample System Malfunction - Low Instrument Air Pressure | Self Corrected - Instrument Air Pressure Increased |
| H2S ppm | 5/22/2014 6:00 AM | 7:59 AM | 2 hours | Maintenance - Shut down H2S analyzer to install a new dedicated air line. | New dedicated Instrument Air line installed to help reduce Low Instrument Air pressure issues. |
| H2S ppm | 6/3/2014 12:00 PM | 12:59 PM | 1 hour | Sample System Malfunction - Low Instrument Air Pressure | Self Corrected - Instrument Air Pressure Increased |
| H2S ppm | 6/10/2014 2:00 PM | 3:59 PM | 2 hours | Sample System Malfunction - Low Instrument Air Pressure | Self Corrected - Instrument Air Pressure Increased |
| H2S ppm | 6/20/2014 1:00 PM | 1:59 PM | 1 hour | Sample System Malfunction - Low Instrument Air Pressure | Self Corrected - Instrument Air Pressure Increased |
| H2S ppm | 6/21/2014 1:00 PM | 1:59 PM | 1 hour | Sample System Malfunction - Low Instrument Air Pressure | Self Corrected - Instrument Air Pressure Increased |
| H2S ppm | 6/21/2014 3:00 PM | 3:59 PM | 1 hour | Sample System Malfunction - Low Instrument Air Pressure | Self Corrected - Instrument Air Pressure Increased |
| H2S ppm | 6/22/2014 1:00 AM | 1:59 AM | 1 hour | Sample System Malfunction - Low Instrument Air Pressure | Self Corrected - Instrument Air Pressure Increased |
| Total duration | | | 22 hours | | |

Comment: Form D - Downtime Summary

Data Sheet for Fuel Gas CEM System Cylinder Gas Audit

1. Date Audit Commenced: 3-Jun-14 Time Audit Commenced: 1:00 PM

2. Audit Gases Used for CGA (All gases to be Protocol 1 Certified):

| Acceptable Audit Gas Ranges | Cylinder Number and Expiration Date | Audit Gas Concentrations | | +/- of Audit Gas Range |
|--|-------------------------------------|--------------------------|-----|------------------------|
| H₂S Low: 400-150 PPM 64-94 | SG9200120 | 76.38 | PPM | 15.28% |
| | 26-Oct-14 | | | |
| H₂S Mid: 250-300 PPM 140-192 | CC3831 | 159.00 | PPM | 31.80% |
| | 29-Apr-15 | | | |

3. CEM System Response:

| | Low-Span H ₂ S PPM | | Mid-Span H ₂ S PPM | |
|------------------------|-------------------------------|---------|-------------------------------|---------|
| | Analyzer | CISCO | Analyzer | CISCO |
| Run 1 | 67.89 | | 151.03 | |
| Run 2 | 68.81 | | 151.38 | |
| Run 3 | 68.48 | | 151.58 | |
| Avg. (d _m) | 68.39 | #DIV/0! | 151.32 | #DIV/0! |
| A | 10.46 | #DIV/0! | 4.83 | #DIV/0! |
| Pass? | Yes | #DIV/0! | Yes | #DIV/0! |

4. Signature of Technician(s) performing CGA:


 Matt Hobbs, Kevin Marschner and/or Tad Milliken

Calculation of A:

$$A = (d_m - c_a) / c_a \times 100$$

A must be +/-15% to pass.

where:

A = accuracy of CEM

d_m = average of reponses

c_a = certified audit value of gas

CERTIFICATE OF ANALYSIS

Grade of Product: EPA Protocol

Part Number: E02NI99E15A0160 Reference Number: 82-124432208-1
Cylinder Number: CC3831 Cylinder Volume: 144.4 CF
Laboratory: ASG - Riverton - NJ Cylinder Pressure: 2015 PSIG
PGVP Number: B52014 Valve Outlet: 330
Gas Code: H2S.BALN Certification Date: Apr 29, 2014

Expiration Date: Apr 29, 2015

Certification performed in accordance with "EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012)" document EPA 800/R-12/531, using the assay procedures listed. Analytical Methodology does not require correction for analytical interference. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a volume/volume basis unless otherwise noted.

Do Not Use This Cylinder below 100 psig, i.e. 0.7 megapascals.

| ANALYTICAL RESULTS | | | | | |
|--------------------|-------------------------|----------------------|-----------------|----------------------------|-------------|
| Component | Requested Concentration | Actual Concentration | Protocol Method | Total Relative Uncertainty | Assay Dates |
| HYDROGEN SULFIDE | 165.0 PPM | 159.0 PPM | G1 | +/-2.0% | 04/29/2014 |
| NITROGEN | Balance | | | | |

| CALIBRATION STANDARDS | | | | | |
|-----------------------|--------|-------------|-------------------------------------|-------------|-----------------|
| Type | Lot ID | Cylinder No | Concentration | Uncertainty | Expiration Date |
| GMIS | 12319 | CC158744 | 199.2 PPM HYDROGEN SULFIDE/NITROGEN | +/- 1.1% | Jan 26, 2016 |
| PRM | 12323 | D249639 | 300.4 PPM HYDROGEN SULFIDE/NITROGEN | +/- 1.0% | Jul 18, 2016 |

The SRM, PRM or RGM noted above is only in reference to the GMIS used in the assay and not part of the analysis

| ANALYTICAL EQUIPMENT | | |
|-----------------------|----------------------|-----------------------------|
| Instrument/Make/Model | Analytical Principle | Last Multipoint Calibration |
| Ametek 9000 RM | NDUV | Apr 29, 2014 |

Triad Data Available Upon Request

Notes:


Approved for Release

1Q14

DEPARTMENT OF ENVIRONMENTAL QUALITY
AIR QUALITY DIVISION
CONTINUOUS EMISSION MONITORING REPORT

FORM A

I. GENERAL INFORMATION

- A. Facility Name: FRONTIER REFINING LLC
- B. Process Unit/Pollutant Monitored: NO_x MONITOR - CRUDE CHARGE HEATER
- C. Applicable Permit Number or Regulation: Consent Decree
- D. Applicable Emission Limit: 0.031 lb/mmmbtu (1-hr average); 6.3 lb/hr (1-hr average)

II. MONITOR INFORMATION

- A. Date of Original Monitor Installation: December 20, 2013 (New Installation)
- B. Date of Latest Monitor Certification: March 6, 2014

C. Pollutant/Opacity Monitor

- 1. Manufacturer: Teledyne Advanced Pollution Instrumentation
- 2. Model Number: T200H/M
- 3. Serial Number Main Chassis: 154
- 4. Basis of Measurement (If Applicable - Wet or Dry): Dry
- 5. Instrument Span, Range Value (Specify Units): 0 - 100 ppm NO_x

D. Diluent Monitor

- 1. Type of Monitor: O₂
- 2. Manufacturer: Teledyne Advanced Pollution Instrumentation
- 3. Model Number: T200H/M
- 4. Serial Number Main Chassis: 154
- 5. Basis of Measurement (If Applicable - Wet or Dry): Dry
- 6. Instrument Span, Range Value (Specify Units): 0 - 25 percent (%)

E. Flow Monitor

- 1. Type of Instrument: Microprocessor Based Delta P Pressure "Smart" Transmitter
- 2. Manufacturer: Air Monitor Corporation
- 3. Model Number: Veltron II
- 4. Serial Number Main Chassis: 81983A

Flow Monitor Probe

- 1. Type of Instrument (i.e. S-type Pitot Tube): Pitot Traverse
- 2. Manufacturer: Air Monitor Corporation
- 3. Model Number: Drawing No. W81983AA
- 4. Serial Number Main Chassis: 81983

F. Quality Assurance Data

- 1. QA Plan Date: To be Submitted
- 2. QA Plan Approval Date:

III. Operating/Monitoring Data

A. Quarter: 1 Year: 2014

B. Total Hours in Reporting Period: 2160

C. Hours Unit Operated During the Reporting Period: 612 (Hours of Operation after Linearity Testing completed)

Note: Include all unit operating time for the quarter including operating time associated with Startup/Shutdown and Chapter 1 Section 5 (Emergency/Abnormal) Operations. Report time in hours to one decimal place, i.e. 1902.8.

IV. Quarterly Audits/Monitoring System Modifications

A. Quarterly Audits

Type Audit: RATA (Including 7-Day Drift Test (January 21, 2014 – January 27, 2014))

| | <u>Date Conducted</u> | <u>Pass</u> |
|----------------------------|-----------------------|-------------|
| Pollutant/Opacity Monitor: | <u>3/4/2014</u> | <u>Yes</u> |
| Diluent Monitor | <u>3/4/2014</u> | <u>Yes</u> |

B. Quarterly Audits

Type Audit: Linearity Test

| | <u>Date Conducted</u> | <u>Pass</u> |
|----------------------------|-----------------------|-------------|
| Pollutant/Opacity Monitor: | <u>3/6/2014</u> | <u>Yes</u> |
| Diluent Monitor | <u>3/6/2014</u> | <u>Yes</u> |

Note: A copy of the quarterly audits shall be included with the corresponding quarterly excess emission report.

B. Equipment Replaced During Reporting Period: New Flow, NO_x, and O₂ CEMS installation on December 20, 2013; Changed O₂ Calibration Bottle.

Note: Only equipment replacements or modifications to the system that could affect the ability of the continuous monitoring system to comply with the associated Performance Specification shall be reported.

V. Report Contact

A. Name: David Weeks, Environmental Engineer

B. Phone Number: (307) 771-8827

1Q14

EXCESS EMISSION SUMMARY REPORT
Crude Charge Heater NO_x (lb/mmbtu) CEMS
1-hr average = 0.031 lb/mmbtu

FORM B

| Emission Data Summary (12-hour average ppm) | | CMS Performance Report | |
|--|-------------|---|-------------|
| I. Duration of Excess Emission in Reporting Period Due to: | | I. CMS Downtime in Reporting Period Due to: | |
| A. Startup/Shutdown | 0.0 | A. Monitor Equipment Malfunction | 1.0 |
| B. Control Equipment Problems | 0.0 | B. Non-Monitor Equipment Malfunctions | 0.0 |
| C. Process Problem | 1.0 | C. Quality Assurance Calibration | 0.0 |
| D. Other Known Causes | 0.0 | D. Other Known Causes | 0.0 |
| E. Unknown Causes | 0.0 | E. Unknown Causes | 0.0 |
| II. Total Duration of Excess Emission | 1.0 | II. Total CMS Downtime | 1.0 |
| III. Total Duration of Excess Emissions x 100 divided by Total Source Operating Time minus Total CMS Downtime | 0.2% | III. Total CMS Downtime x 100 divided by Total Source Operating Time | 0.2% |

Total time of excess emission events due to emergency/abnormal operations: 0.

NOTE:

1. Only report excess emissions which occur when the unit/process is operating. Include all excess emissions in the Emission Data Summary including those excess emissions associated with startup/shutdown and those excess emissions associated with Chapter 1 Section 5 (Emergency/Abnormal) operations. Report times in hours for gaseous monitors and in tenths of an hour for opacity monitors. Include detailed excess emission information and causes in the Excess Emission Table (Form C).
2. Only report CEM downtime which occurs while the unit/process is operating. Report time in hours to one decimal point. Include detailed CEM downtime and causes in the Monitor Outage Table (Form D).
3. Include an explanation of what corrective actions were taken for total excess emissions or monitor downtime for the quarter (Emission Data Summary and CMS Performance Summary, Item III) greater than 5%. (See Instructions for further details.)
4. New CEMS installation on December 20, 2013. Data not valid until March 6, 2014 after 7-Day Drift Test, RATA and Linearity Test was successfully completed.

1Q14 Crude Charge Heater CEMS
Form C - Excess Emissions Summary

NOx lb/mmbtu (1-Hour)

| No. | Start Time | End Time | Hours | Reason | Action |
|---------------------------------------|-----------------------|-----------------------|--------------|---|--------------------------------|
| 1 | 3/22/2014 11:00:00 AM | 3/22/2014 12:00:00 PM | 1 | Emission Exceedance - NO _x lb/mmbtu - High Excess O ₂ | Adjusted Excess O ₂ |
| Total Periods Excess Emissions | | | 1 | | |

1Q14 Crude Charge Heater CEMS
Form D - Monitor Downtime Summary

NOx lb/mmmbtu (1-Hour)

| No. | Start Time | End Time | Hours | Reason | Action |
|--|----------------------|----------------------|--------------|--|------------------------|
| 1 | 3/21/2014 6:00:00 AM | 3/21/2014 7:00:00 AM | 1 | Failed Morning O2 Span Calibration Check | Ran Manual Calibration |
| Total Hours Monitor Unavailable | | | 1 | | |

1Q14

EXCESS EMISSION SUMMARY REPORT
Crude Charge Heater NO_x (lb/hr) CEMS
1-hr average = 6.3 lb/hr

FORM B

| Emission Data Summary (lb/hr) | | CMS Performance Report | |
|--|-------------|---|-------------|
| I. Duration of Excess Emission in Reporting Period Due to: | | I. CMS Downtime in Reporting Period Due to: | |
| A. Startup/Shutdown | 0.0 | A. Monitor Equipment Malfunction | 51.0 |
| B. Control Equipment Problems | 0.0 | B. Non-Monitor Equipment Malfunctions | 0.0 |
| C. Process Problem | 0.0 | C. Quality Assurance Calibration | 0.0 |
| D. Other Known Causes | 0.0 | D. Other Known Causes | 0.0 |
| E. Unknown Causes | 0.0 | E. Unknown Causes | 0.0 |
| II. Total Duration of Excess Emission | 0.0 | II. Total CMS Downtime | 51.0 |
| III. Total Duration of Excess Emissions x 100 divided by Total Source Operating Time minus Total CMS Downtime | 0.0% | III. Total CMS Downtime x 100 divided by Total Source Operating Time | 8.3% |

Total time of excess emission events due to emergency/abnormal operations: 0.

NOTE:

1. Only report excess emissions which occur when the unit/process is operating. Include all excess emissions in the Emission Data Summary including those excess emissions associated with startup/shutdown and those excess emissions associated with Chapter 1 Section 5 (Emergency/Abnormal) operations. Report times in hours for gaseous monitors and in tenths of an hour for opacity monitors. Include detailed excess emission information and causes in the Excess Emission Table (Form C).
2. Only report CEM downtime which occurs while the unit/process is operating. Report time in hours to one decimal point. Include detailed CEM downtime and causes in the Monitor Outage Table (Form D).
3. Include an explanation of what corrective actions were taken for total excess emissions or monitor downtime for the quarter (Emission Data Summary and CMS Performance Summary, Item III) greater than 5%. (See Instructions for further details.)
4. New CEMS installation on December 20, 2013. Data not valid until March 6, 2014 after 7-Day Drift Test, RATA and Linearity Test was successfully completed.

1Q14 Crude Charge Heater CEMS
Form C - Excess Emissions Summary

NOx lb/hr (1-Hour)

| No. | Start Time | End Time | Hours | Reason | Action |
|------------|-------------------|-----------------|--------------|---------------|---------------|
|------------|-------------------|-----------------|--------------|---------------|---------------|

There are no excess emissions for this report.

Total Periods Excess Emissions **0**

1Q14 Crude Charge Heater CEMS Form D - Monitor Downtime Summary

NOx lb/hr (1-Hour)

| <i>No.</i> | <i>Start Time</i> | <i>End Time</i> | <i>Hours</i> | <i>Reason</i> | <i>Action</i> |
|--|----------------------|----------------------|--------------|---|---|
| 1 | 3/12/2014 6:00:00 AM | 3/13/2014 6:00:00 AM | 24 | Failed Morning Stack Flow Delta P Span Calibration Check and Subsequent Manual Calibrations | Morning Calibration Check Cleared the Alarm |
| 2 | 3/21/2014 6:00:00 AM | 3/21/2014 8:00:00 AM | 2 | Failed Morning Stack Flow Delta P Span Calibration Check | Ran Manual Calibration |
| 3 | 3/23/2014 6:00:00 AM | 3/24/2014 6:00:00 AM | 24 | Failed Morning Stack Flow Delta P Span Calibration Check | Morning Calibration Check Cleared the Alarm |
| 4 | 3/31/2014 6:00:00 AM | 3/31/2014 7:00:00 AM | 1 | Failed Morning Stack Flow Delta P Span Calibration Check | Ran Manual Calibration |
| <i>Total Hours Monitor Unavailable</i> | | | 51 | | |



April 8, 2014

Mr. Fred DiLella
Stationary Source Compliance Program Manager
Air Quality Division, Wyoming-DEQ
122 West 25th Street
Cheyenne, WY 82002

Subject: Crude Charge Heater Initial RATA and Compliance Test, 7-Day Drift Test, and Linearity Test Reports

Frontier Refining LLC (Frontier) installed a Continuous Emissions Monitoring System (CEMS) on the Crude Charge Heater (Source ID 21) to meet the requirements of the Consent Decree. The CEMS was put into operation on December 26, 2013, and the initial testing was performed per the protocol submitted on November 1, 2013.

Attached please find the reports of the Relative Accuracy Test Audit (RATA) and Compliance Test conducted on March 4, 2014, the 7-Day Drift Test from January 21, 2014 through January 27, 2014, and Linearity Test conducted on March 6, 2014. These initial stack tests were conducted to demonstrate compliance with Operating Permit 3-0-149-2.

The testing showed the unit to be in compliance with all of the performance standards.

If you have any questions or comments, please contact me at (307) 634-3551.

Sincerely,

David Weeks
Environmental Engineer

Attachment

cc. Glenn Spangler, WDEQ District 1 Engineer
Mark Gagen, WDEQ CEMS Coordinator
Mike Achacoso, Frontier Refining LLC
Glenn Travis, Frontier Refining LLC

I certify that the information contained in this report is true, accurate, and complete to the best of my knowledge based upon my reasonable inquiry of the person(s) responsible for preparing this report.

Mike Achacoso
Vice President & Refinery Manager

Frontier Refining LLC
300 Morrie Ave. • Cheyenne, WY 82007
(307) 634-3551 • <http://www.hollyfrontier.com>



**Source Emissions Test Report
Frontier Refining LLC**

**Relative Accuracy Test Audit
Crude Charge Heater
Relative Accuracy Test Audit and Compliance Testing – NO_x
Cheyenne, Wyoming**

Test Date: March 4, 2014

**Report prepared for:
Frontier Refining LLC
300 Morrie Avenue
Cheyenne, Wyoming 82007**

**Report prepared by:
Air Pollution Testing, Inc.
5530 Marshall Street
Arvada, Colorado 80002**

APT Project: FRO3331

**DENVER OFFICE
5530 Marshall Street
Arvada, CO 80002
(303) 420-5949
FAX (303) 420-5920
(800) 268-6213**





Certification

Team Leader Certification:

I certify that all of the sampling and analytical procedures and data presented in this report are authentic and accurate.

A handwritten signature in black ink, appearing to read 'Adam Loes'.

**Adam Loes
Field Team Leader / Project Manager**

Reviewer Certification:

I certify that all of the testing details and conclusions are accurate and valid.

A handwritten signature in black ink, appearing to read 'Karl Breuer'.

**Karl Breuer
Reviewer / Senior Technical Writer**



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1. Introduction

Air Pollution Testing, Inc. (APT) was contracted by Frontier Refining LLC (Frontier) to conduct a Relative Accuracy Test Audit (RATA) at the Cheyenne Wyoming Refinery. The Frontier Cheyenne Refinery processes crude oil to produce a variety of products and is located in Cheyenne, Laramie County, Wyoming.

The purpose of the testing program was to determine the Relative Accuracy (RA) of the oxygen (O₂) and nitrogen oxides (NO_x) Continuous Emission Monitoring Systems (CEMS) currently in place on the Crude Charge Heater (Source 21) at the Cheyenne Refinery. Additionally, each set of three RATA runs were combined into a single compliance run (for a total of 3 compliance runs) to determine compliance with the permitted emission restrictions. Concurrent stack gas volumetric flow measurements were collected for the determination of mass emission rates. The testing program was conducted with the Crude Charge Heater and all associated processes operating under normal operating conditions.

The data collected during the testing program are being used to determine the compliance status with respect to applicable Wyoming Department of Environmental Quality (WDEQ) permit requirements.

Key contact personnel involved in the test program are provided in Table 1.1. Source identification and emission limit summaries are provided in Table 1.2 on the following page.

| Frontier Refining LLC : Cheyenne, Wyoming – Crude Charge Heater Test Program Contact Personnel | | |
|---|---|---|
| Name, Title | Company, Address | Telephone, Facsimile |
| Mr. David Weeks, Environmental Engineer | Frontier Refining LLC 300 Morrie Street Cheyenne, Wyoming 82007 | (307) 771 8827, (307) 771 8794 |
| Mr. Mark Gagen, Air Quality CEMS Coordinator | WDEQ 122 West 25th Street Cheyenne, Wyoming 82002 | (307) 777 7334, (307) 777 5616 |
| Mr. Glenn Spangler, Air Quality District 1 Engineer | | (307) 777 3787, (307) 777 5616 |
| Mr. Dave Maiers, Operations Director | Air Pollution Testing, Inc. 5530 Marshall Street Arvada, Colorado 80002 | (303) 420 5949 ext. 33, (303) 420 5920 |

Table 1.1: Test Program Contact Personnel

| Frontier Refining LLC : Crude Charge Heater Source Identification Summary | | |
|--|-------------------|---|
| Source Identification | Testing Parameter | Emission Limits |
| Crude Charge Heater Capacity: 202 MMBtu/hr Source ID: 21 | O ₂ | PS 3 – average d ≤ 1.0% (%vd) |
| | NO _x | PS 2 – RA: 20% RM or 10% ES (ppmvd) PS 6 – RA: 20% RM or 10% ES (lb/MMBtu) |
| NO _x Emission Standard – 0.031 lb/MMBtu, 6.3 lb/hr | | |

Table 1.2: Source Identification Summary

2. Methods

Air Pollution Testing, Inc. (APT) tested in accordance with the following U.S. Environmental Protection Agency (EPA) source emissions test methods referenced in 40 CFR Part 60, Appendix A.

EPA Method 1 – Sample and Velocity Traverses for Stationary Sources

EPA Method 2 – Determination of Stack Gas Velocity and Volumetric Flow Rate (Type S Pitot Tube)

EPA Method 3A – Determination of Oxygen and Carbon Dioxide Concentrations in Emissions from Stationary Sources (Instrumental Analyzer Procedure)

EPA Method 4 – Determination of Moisture Content in Stack Gases

EPA Method 7E – Determination of Nitrogen Oxides Emissions from Stationary Sources (Instrumental Analyzer Procedure)

The test methods were used to demonstrate compliance with the following Performance Specifications referenced in 40 CFR Part 60, Appendix B.

Performance Specification 2 – Specifications and Test Procedures for SO₂ and NO_x Continuous Emission Monitoring Systems in Stationary Sources

Performance Specification 3 – Specifications and Test Procedures for O₂ and CO₂ Continuous Emission Monitoring Systems in Stationary Sources

Performance Specifications 6 – Specifications and Test Procedures for Continuous Emission Rate Monitoring Systems in Stationary Sources

3. Test Program Summary

The testing performed by APT determined all emissions parameters detailed in Table 3.1.

On-site gas analyzers, housed in a temperature-controlled analytical trailer, were used to determine the emission concentrations of oxygen (O₂), carbon dioxide (CO₂) and NO_x from the Crude Charge Heater. Concurrent gas velocity and moisture content measurements were conducted to calculate NO_x mass emission rates.

Ten sampling runs conducted for a minimum of 21 minutes were performed for the RATA with nine runs used to determine relative accuracy. A velocity traverse was conducted at the beginning of each sampling period. A total of 3 moisture runs were conducted. The emission data from each sampling period was compared with CEMS data to calculate the RA of the system. The NO_x RA was calculated in units of parts per million, dry volume basis (ppmvd) and pounds per million British thermal units (lb/MMBtu). The O₂ RA was calculated in percent, dry volume basis (%vd).

Prior to the RATA test periods, the more stringent 12-point stratification test requirements described in 40 CFR Part 75, Appendix A, Section 6.5.6.1 were performed to determine appropriate pollutant and diluent sampling points. The number and location of the velocity traverse points were selected in accordance with EPA Method 1.

| Frontier Refining LLC : Crude Charge Heater FCCU Regenerator Vent RATA Sampling and Analytical Methods Summary | | | |
|---|-----------------|----------------------------------|-------------|
| Emission Parameter | Sampling Method | Analytical Method | Laboratory |
| gas flow | Methods 1, 2 | draft gauge | APT on-site |
| oxygen (O ₂) | Method 3A | paramagnetic analyzer | |
| carbon dioxide (CO ₂) | Method 3A | non-dispersive infrared analyzer | |
| moisture (H ₂ O) | Method 4 | gravimetric | |
| NO _x | Method 7E | chemiluminescent analyzer | |

Table 3.1: Sampling and Analytical Methods Summary

4. Test Method Details

4.1. Stack Gas Flow, Oxygen, Carbon Dioxide, Moisture

Stack gas velocity, volumetric flow rate, O₂, CO₂, and moisture (H₂O) content were measured in accordance with EPA Methods 1, 2, 3A, and 4.

Each sampling period consisted of conducting a temperature and differential pressure traverse of the stack using a K-type thermocouple and an S-type pitot tube. Concurrent with each traverse, a sample of gas for moisture determination was extracted from the stack at a constant flow rate of no greater than 0.75 cubic feet per minute. The gas sample passed through a stainless steel probe, through a series of 4 chilled glass impingers, and through a calibrated dry gas meter. Please see *Appendix 5 – Schematics* for a diagram of the EPA Method 1, 2 and 4 sampling train.

Concurrently, a sample of stack gas was extracted through a heated Teflon line, passed through a refrigeration-type gas conditioner to remove moisture, and directed to a Servomex Series 1400 paramagnetic O₂ analyzer and a Servomex Series 1400 non-dispersive Infrared (NDIR) CO₂ analyzer connected in series. The O₂ and CO₂ concentrations were displayed on the analyzer front panels in units of dry volume percent (%vd) and logged to a computerized data acquisition system (CDAS).

Prior to sampling, the first two impingers were each seeded with 100 milliliters of water. The third impinger was empty. The fourth impinger was seeded with 250 grams of silica gel. Before and after each sampling period, the analyzers were challenged with calibration gases to calibrate the instruments, to verify linearity of response, and to quantify span and zero drift for the previous sampling period. The calibration gases were certified in accordance with EPA Protocol 1. To ensure no system bias, the analyzer calibrations were conducted by introducing all gases to the analyzers at the sampling probe tip at stack pressure.

Following sampling, the moisture gain in the impingers was measured gravimetrically to determine the moisture content of the stack gas. The CDAS data were averaged in one-minute increments, corrected for instrumental drift, and reported as average concentrations for each sampling period in units of %vd.

All of the above data were combined to calculate the stack gas velocity and volumetric flow rate in units of feet per second (ft/sec), actual cubic feet per minute (acfm), dry standard (1 atmosphere and 68° F) cubic feet per minute (dscfm), and pounds per hour (lb/hr).

4.2. Nitrogen Oxides

NO_x emissions were measured in accordance with EPA Method 7E.

Each sampling period consisted of extracting a gas sample from the stack at a constant flow rate of approximately two (2) liters per minute. The sample passed through a refrigeration-type gas conditioner to remove moisture and into the sampling port of a Thermo Environmental Instruments (TECO) Model 42CHL chemiluminescent NO_x analyzer. The NO_x concentrations were displayed on the analyzer front panels in units of ppmvd and logged to a CDAS.

Before and after each sampling period, the analyzer was challenged with calibration gases to calibrate the instruments, to verify linearity of response, and to quantify zero and span drift for the previous sampling period. The calibration gases were prepared and certified in accordance with EPA Protocol 1. To ensure no system bias, the analyzer calibrations were conducted by introducing all gases to the analyzer at the sampling probe tip at stack pressure. Please see *Appendix 5 – Schematics* for a diagram of the EPA Methods 3A and 7E sampling train.

Following sampling, the CDAS data were averaged in one-minute increments, corrected for instrumental drift, and reported as average NO_x emission concentrations for each sampling period in units of ppmvd. The concentration data were combined with concurrently collected stack gas flow and diluents data to calculate the NO_x mass emission rates in units of lb/hr (with NO_x expressed as NO₂) and lb/MMBtu.

5. Results

The results of the testing are presented in Tables 5.1 and 5.2. Any testing parameters not found in the tables may be found in *Appendix 1 - Testing Parameters / Sample Calculations* at the back of this report. Ten RATA runs were performed and nine were used to calculate RA. Stricken values do not enter into the calculations.

The following terms and abbreviations are used in the tables:

- RATA – Relative Accuracy Test Audit
- ppmvd – parts per million, dry volume basis
- RM – reference method
- CEM – continuous emission monitor
- d – difference (RM - CEM)
- |d| – absolute value of the difference (RM - CEM)
- %vd – percent volume, dry
- RA – relative accuracy (% of RM data unless noted otherwise)
- dscfm – volumetric flow in dry standard cubic feet per minute

Project Number FRO3331
Test Report, Frontier Refinery Crude Charge Heater

- **lb/hr – pounds per hour**
- **lb/MMBtu – pounds per million British thermal units**
- **PS – performance specification**

| Frontier Refining LLC Crude Charge Heater RATA Results Summary, March 4, 2014 | | | | | | | | | |
|--|-----|-----|-----|-------------------------|------|-----|----------------------------|-------|--------|
| O ₂ (%vd) | | | | NO _x (ppmvd) | | | NO _x (lb/MMBtu) | | |
| Run | RM | CEM | d | RM | CEM | d | RM | CEM | d |
| 1 | 4.1 | 4.1 | 0.0 | 21.7 | 17.5 | 4.2 | 0.027 | 0.023 | 0.0050 |
| 2 | 4.1 | 4.1 | 0.1 | 21.4 | 17.2 | 4.2 | 0.027 | 0.022 | 0.0050 |
| 3 | 4.1 | 4.0 | 0.1 | 21.5 | 17.4 | 4.1 | 0.027 | 0.022 | 0.0050 |
| 4 | 4.2 | 4.0 | 0.2 | 21.5 | 17.3 | 4.3 | 0.027 | 0.022 | 0.0053 |
| 5 | 4.1 | 4.0 | 0.1 | 21.6 | 17.3 | 4.3 | 0.027 | 0.022 | 0.0053 |
| 6 | 4.1 | 4.1 | 0.0 | 21.7 | 17.4 | 4.2 | 0.027 | 0.022 | 0.0050 |
| 7 | 4.1 | 4.0 | 0.0 | 22.2 | 17.3 | 4.0 | 0.028 | 0.022 | 0.0050 |
| 8 | 4.1 | 4.1 | 0.1 | 21.7 | 17.4 | 4.3 | 0.028 | 0.022 | 0.0052 |
| 9 | 4.1 | 4.0 | 0.1 | 21.4 | 17.3 | 4.1 | 0.027 | 0.022 | 0.0050 |
| 10 | 4.1 | 4.0 | 0.1 | 21.6 | 17.3 | 4.3 | 0.027 | 0.022 | 0.0053 |
| Average | 4.1 | 4.0 | 0.1 | 21.6 | 17.3 | 4.2 | 0.027 | 0.022 | 0.0051 |
| RA (d) | | | | RA (%) | | | RA (%) | | |
| Limit | | | | Limit | | | Limit | | |
| 0.079 | | | | 19.95% | | | 19.08% | | |
| 1.0 (PS3) | | | | 20% (PS2) | | | 20% (PS6) | | |

Table 5.1: RATA Results – O₂ and NO_x

Project Number FRO3331
Test Report, Frontier Refinery Crude Charge Heater

| Frontier Refining LLC: Cheyenne, Wyoming Facility Crude Charge Heater Compliance Results Summary, March 4, 2014 | | | | | |
|--|--------|--------|--------|---------|-------------------|
| Run | 1 | 2 | 3 | Average | Applicable Limits |
| Start Time | 9:46 | 11:31 | 13:02 | | |
| Stop Time | 11:18 | 12:54 | 14:25 | | |
| O ₂ (%vd) | 4.1 | 4.1 | 4.1 | 4.1 | |
| CO ₂ (%vd) | 10.3 | 10.4 | 10.3 | 10.3 | |
| Gas Flow (dscfm) | 30,695 | 31,526 | 29,279 | 30,500 | |
| Moisture Content (%) | 14.3 | 13.9 | 15.1 | 14.4 | |
| NO _x (ppmvd) | 21.5 | 21.6 | 21.8 | 21.6 | |
| NO _x (lb/hr) | 4.73 | 4.88 | 4.57 | 4.72 | 6.3 |
| NO _x (lb/MMBtu) | 0.027 | 0.027 | 0.028 | 0.027 | 0.031 |

Table 5.2: Compliance Test Results – NO_x

6. Conclusions

The results of the testing conducted by APT on March 4, 2014 at the Frontier Refining Crude Charge Heater located in Cheyenne, Wyoming indicate that the stack gas O₂ and NO_x CEMS are operating in compliance with applicable performance specifications. Additionally, the testing demonstrates that the unit is also in compliance with the permitted mass emission limits for NO_x.

Appendix 1

Test Parameters / Sample Calculations

Frontier Refining LLC
Frontier Refinery
Cheyenne, Wyoming
Crude Charge Heater
03/04/14

RATA Calculations

| Run | RM | O ₂ (%vd) | | Used? (Y/N) |
|-----------------------|-----|----------------------|------------|-------------|
| | | CEM | RM-CEM | |
| 1 | 4.1 | 4.1 | 0.0 | Y |
| 2 | 4.1 | 4.1 | 0.1 | Y |
| 3 | 4.1 | 4.0 | 0.1 | Y |
| 4 | | | | n |
| 5 | 4.1 | 4.0 | 0.1 | Y |
| 6 | 4.1 | 4.1 | 0.0 | Y |
| 7 | 4.1 | 4.0 | 0.0 | y |
| 8 | 4.1 | 4.1 | 0.1 | Y |
| 9 | 4.1 | 4.0 | 0.1 | Y |
| 10 | 4.1 | 4.0 | 0.1 | Y |
| Average | | 4.1 | 0.1 | |
| Number of Runs | | 9 | | |
| T value | | 2.306 | | |
| vd | | 0.079 | | |
| Std. Dev | | 0.043 | | |
| CC | | 0.033 | | |

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Cheyenne, Wyoming
Crude Charge Heater
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RATA Calculations

| Run | RM | NO _x (ppmvd) | | Used? (Y/N) |
|-------------------|-------------|-------------------------|------------|-------------|
| | | CEM | RM-CEM | |
| 1 | 21.7 | 17.5 | 4.2 | Y |
| 2 | 21.4 | 17.2 | 4.2 | Y |
| 3 | 21.5 | 17.4 | 4.1 | Y |
| 4 | 21.5 | 17.3 | 4.3 | Y |
| 5 | 21.6 | 17.3 | 4.3 | Y |
| 6 | 21.7 | 17.4 | 4.2 | Y |
| 7 | | | | N |
| 8 | 21.7 | 17.4 | 4.3 | Y |
| 9 | 21.4 | 17.3 | 4.1 | Y |
| 10 | 21.6 | 17.3 | 4.3 | Y |
| Average | 21.6 | 17.3 | 4.2 | |
| Number of Runs | | 9 | | |
| T value | | 2.306 | | |
| d | | 4.232 | | |
| Std. Dev | | 0.093 | | |
| CC | | 0.072 | | |
| RA (% of RM Data) | | 19.95% | | |

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Crude Charge Heater
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RATA Calculations

| Run | NO _x (lb/MMBtu) F _d | | | Used? (Y/N) |
|-------------------|---|--------------|---------------|-------------|
| | RM | CEM | RM-CEM | |
| 1 | 0.027 | 0.023 | 0.0050 | Y |
| 2 | 0.027 | 0.022 | 0.0050 | y |
| 3 | 0.027 | 0.022 | 0.0050 | Y |
| 4 | 0.027 | 0.022 | 0.0053 | Y |
| 5 | 0.027 | 0.022 | 0.0053 | Y |
| 6 | 0.027 | 0.022 | 0.0050 | Y |
| 7 | | | | n |
| 8 | 0.028 | 0.022 | 0.0052 | Y |
| 9 | 0.027 | 0.022 | 0.0050 | Y |
| 10 | 0.027 | 0.022 | 0.0053 | Y |
| Average | 0.027 | 0.022 | 0.0051 | |
| Number of Runs | | 9 | | |
| T value | | 2.308 | | |
| d | | 0.005 | | |
| Std. Dev | | 0.000 | | |
| CC | | 0.000 | | |
| RA (% of RM Data) | | 19.08% | | |

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Cheyenne, Wyoming
Crude Charge Heater
3/4/2014

| Field Reference Method Data | | | | | | | | | | | | Average |
|-----------------------------|---|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|
| Run # | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | | |
| Start Time | 9:48 | 10:20 | 10:55 | 11:31 | 12:03 | 12:33 | 13:02 | 13:33 | 14:04 | 14:40 | | |
| Stop Time | 10:08 | 10:41 | 11:18 | 11:53 | 12:24 | 12:54 | 13:25 | 13:55 | 14:25 | 15:01 | | |
| Sample Duration (minutes) | 23 | 21 | 22 | 22 | 21 | 21 | 23 | 22 | 21 | 21 | | |
| D_s | Stack Diameter (inches) | 102.00 | 102.00 | 102.00 | 102.00 | 102.00 | 102.00 | 102.00 | 102.00 | 102.00 | 102.00 | |
| ΔP_{H_2O} | Average (Delta P) (" H ₂ O) ^h | 0.243 | 0.257 | 0.256 | 0.250 | 0.261 | 0.259 | 0.249 | 0.247 | 0.236 | 0.246 | |
| C_p | Pilot Tube Constant (unitless) | 0.837 | 0.837 | 0.837 | 0.837 | 0.837 | 0.837 | 0.837 | 0.837 | 0.837 | 0.837 | |
| T_s | Stack Temperature (°F) | 312 | 314 | 314 | 308 | 309 | 308 | 330 | 328 | 326 | 324 | |
| P_{bar} | Barometric Pressure (inbar) | 807 | 807 | 807 | 807 | 807 | 807 | 807 | 807 | 807 | 807 | |
| P_{atm} | Barometric Pressure (" Hg) | 23.83 | 23.83 | 23.83 | 23.83 | 23.83 | 23.83 | 23.83 | 23.83 | 23.83 | 23.83 | |
| P_s | Stack Pressure ("H ₂ O) | 0.10 | 0.10 | 0.10 | 0.10 | 0.10 | 0.10 | 0.10 | 0.10 | 0.10 | 0.10 | |
| Y_s | Meter Y Factor (unitless) | 1.017 | 1.017 | 1.017 | 1.017 | 1.017 | 1.017 | 1.017 | 1.017 | 1.017 | 1.017 | |
| T_m | Meter Temperature (°F) | 48 | 48 | 48 | 43 | 43 | 43 | 42 | 42 | 42 | 44 | |
| V_m | Sample Volume (ft ³) | 58.463 | 58.463 | 58.463 | 58.735 | 58.735 | 58.735 | 76.616 | 76.616 | 76.616 | 65.806 | |
| ΔH | Orifice Pressure Delta H (" H ₂ O) | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| V_b | Molten (g) | 174.1 | 174.1 | 174.1 | 171.5 | 171.5 | 171.5 | 247.0 | 247.0 | 247.0 | 202.5 | |
| F_s | F_s value (dscf/MMBtu) | 8.543 | 8.543 | 8.543 | 8.543 | 8.543 | 8.543 | 8.543 | 8.543 | 8.543 | 8.543 | |
| F_b | F_b value (dscf/MMBtu) | 1.040 | 1.040 | 1.040 | 1.040 | 1.040 | 1.040 | 1.040 | 1.040 | 1.040 | 1.040 | |
| O_2 Nvd | O_2 (Nvd) | 4.1 | 4.1 | 4.1 | 4.2 | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 | |
| | O_2 (Nvd)-3 run average | 4.1 | | | 4.1 | | | 4.1 | | | 4.1 | |
| CO_2 Nvd | CO_2 (Nvd) | 10.2 | 10.3 | 10.4 | 10.4 | 10.4 | 10.4 | 10.3 | 10.3 | | 10.4 | |
| | CO_2 (Nvd)-3 run average | 10.3 | | | 10.4 | | | 10.3 | | | 10.3 | |
| N_2 Nvd | N_2 (Nvd) | 85.7 | 85.5 | 85.4 | 85.4 | 85.5 | 85.6 | 85.6 | 85.6 | 85.5 | 85.5 | |
| dry | NO_x (ppmv) | 21.7 | 21.4 | 21.5 | 21.5 | 21.6 | 21.7 | 22.2 | 21.7 | 21.4 | 21.8 | |
| dry | NO_x (ppmv)-3 Run Average | 21.5 | | | 21.5 | | | 21.6 | | | 21.6 | |

| Reference Method Calculations | | | | | | | | | | | | Average | Permit Limit | |
|-------------------------------|--|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|--------------|---------|
| Run # | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | | | | |
| V _{scf} | Sample Volume (dscf) | 49.345 | 49.345 | 49.345 | 50.032 | 50.032 | 50.032 | 65.420 | 65.420 | 65.420 | 65.420 | | | 55.901 |
| V _{scf} | Moisture Volume (scf) | 8.209 | 8.209 | 8.209 | 8.091 | 8.091 | 8.091 | 11.846 | 11.846 | 11.846 | 11.846 | | | 9.548 |
| B _{scf} | Moisture Content (%/100) | 0.143 | 0.143 | 0.143 | 0.139 | 0.139 | 0.139 | 0.151 | 0.151 | 0.151 | 0.151 | | | 0.145 |
| %wv | Moisture Content (%wv) | 14.3 | 14.3 | 14.3 | 13.9 | 13.9 | 13.9 | 15.1 | 15.1 | 15.1 | 15.1 | | | 14.5 |
| %wv | Moisture Content (%wv)-3 run avg. | 14.3 | 14.3 | 14.3 | 13.9 | 13.9 | 13.9 | 15.1 | 15.1 | 15.1 | 15.1 | | | 14.4 |
| M _D | Molecular Weight Dry (lb/lb-mole) | 29.80 | 29.82 | 29.83 | 29.84 | 29.83 | 29.82 | 29.82 | 29.81 | 29.81 | 29.83 | | | 29.82 |
| M _A | Molecular Weight Wet (lb/lb-mole) | 28.12 | 28.13 | 28.15 | 28.19 | 28.18 | 28.18 | 28.03 | 28.03 | 28.03 | 28.05 | | | 28.31 |
| V _s | Gas Velocity (ft/sec) | 18.8 | 19.7 | 19.5 | 19.1 | 20.0 | 19.8 | 19.4 | 19.2 | 18.3 | 18.3 | | | 18.3 |
| Q _{scfm} | Gas Flow (scfm) | 63,404 | 67,148 | 66,881 | 65,082 | 68,099 | 67,581 | 66,965 | 65,324 | 62,423 | 65,407 | | | 65,741 |
| Q _{dscfm} | Gas Flow (dscfm) | 29.821 | 31.301 | 31.185 | 30.889 | 32.075 | 31.810 | 29.892 | 29.602 | 28.374 | 29,810 | | | 30,431 |
| | Gas Flow (dscfm)-3 run average | 30.695 | 30.695 | 30.695 | 31.525 | 31.525 | 31.525 | 29.779 | 29.779 | 29.779 | 30,580 | | | 30,580 |
| Q _{wscfm} | Gas Flow (wscfm) | 34,548 | 36,508 | 36,348 | 35,852 | 37,286 | 36,954 | 35,178 | 34,872 | 33,425 | 36,116 | | | 35,587 |
| Q _{lowsfm} | Gas Flow (lowsfm) | 2,073 | 2,190 | 2,181 | 2,139 | 2,236 | 2,217 | 2,111 | 2,092 | 2,006 | 2,107 | | | 2,135 |
| Q _{lowsfm} | Gas Flow (lowsfm) | 35 | 37 | 36 | 36 | 37 | 37 | 35 | 35 | 33 | 35 | | | 36 |
| Q _{lbm} | Gas Flow (lb/hr) | 151,273 | 158,933 | 158,321 | 158,505 | 163,530 | 162,144 | 153,550 | 152,203 | 145,895 | 153,388 | | | 155,773 |
| F _s | F _s (unitless) | 1.644 | 1.624 | 1.607 | 1.601 | 1.618 | 1.623 | 1.627 | 1.627 | 1.627 | 1.610 | | | 1.621 |
| %wv | O ₂ (%wv) | 3.5 | 3.5 | 3.6 | 3.6 | 3.6 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | | | 3.524 |
| %wv | CO ₂ (%wv) | 8.8 | 8.8 | 8.9 | 8.9 | 8.9 | 8.9 | 8.9 | 8.7 | 8.8 | 8.9 | | | 8.853 |
| ppmv | NO _x (ppmv) | 18.6 | 18.4 | 18.5 | 18.5 | 18.6 | 18.6 | 18.8 | 18.4 | 18.2 | 18.3 | | | 18.495 |
| lb/hr | NO _x (lb/hr) | 4.58 | 4.80 | 4.80 | 4.73 | 4.96 | 4.93 | 4.74 | 4.60 | 4.35 | 4.81 | | | 4.71 |
| lb/hr | NO _x (lb/hr)-3 run average | 4.73 | 4.73 | 4.73 | 4.88 | 4.88 | 4.88 | 4.57 | 4.57 | 4.57 | 4.72 | | | 4.72 |
| F _s | NO _x (lb/MMBtu) | 0.027 | 0.027 | 0.027 | 0.027 | 0.027 | 0.027 | 0.028 | 0.028 | 0.027 | 0.027 | | | 0.027 |
| F _s | NO _x (lb/MMBtu)-3 run average | 0.027 | 0.027 | 0.027 | 0.027 | 0.027 | 0.027 | 0.028 | 0.028 | 0.027 | 0.027 | | | 0.027 |

| CEMS Data | | | | | | | | | | | |
|----------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---------|
| Run # | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Average |
| O ₂ (%vol) | 4.1 | 4.1 | 4.0 | 4.0 | 4.0 | 4.1 | 4.0 | 4.1 | 4.0 | 4.0 | 4.0 |
| NO _x (ppmv) | 17.5 | 17.2 | 17.4 | 17.3 | 17.3 | 17.4 | 17.3 | 17.4 | 17.3 | 17.3 | 17.3 |
| NO _x (lb/MMBtu) | 0.023 | 0.022 | 0.022 | 0.022 | 0.022 | 0.022 | 0.022 | 0.022 | 0.022 | 0.022 | 0.022 |

Frontier Refining LLC
Frontier Refinery
Cheyenne, Wyoming
Crude Charge Heater
03/04/14

Run 1

| | |
|------------|-------------|
| Start Time | 3/4/14 9:46 |
| Run Length | 23 |
| Stop Time | 10:09 |

| | | Calibration Information | | |
|-----------------------|-------|------------------------------|-------------------------------|---------------------------------|
| Gas | | O ₂ | CO ₂ | NO _x |
| Instrument Range | | 9.8 | 19.7 | 39 |
| Span Gas Value | | 4.90 | 10.00 | 18.2 |
| Calibration | | | | |
| Pretest Calibration | | | | |
| Zero% | | 0.1 | 0.0 | 0.0 |
| Span% | | 5.0 | 10.1 | 19.0 |
| Post Test Calibration | | | | |
| Zero% | | 0.0 | 0.0 | 0.0 |
| Span% | | 4.8 | 10.0 | 18.0 |
| Results | | | | |
| Absolute Bias (Zero) | | 0.0% | 0.0% | 0.0% |
| Absolute Bias (Span) | | 2.0% | 0.5% | 1.5% |
| Absolute Drift (Zero) | | 1.0% | 0.0% | 0.0% |
| Absolute Drift (Span) | | 2.0% | 0.5% | 2.6% |
| | | Corrected O ₂ % | Corrected CO ₂ % | Corrected NO _x ppm |
| | | 4.1 | 10.2 | 21.7 |
| Run Length (Minutes) | Time | Uncorrected O ₂ % | Uncorrected CO ₂ % | Uncorrected NO _x ppm |
| | | 4.1 | 10.3 | 22.0 |
| 0.5 | 9:46 | 4.2 | 10.2 | 22.4 |
| 1 | 9:46 | 4.2 | 10.2 | 22.4 |
| 1.5 | 9:47 | 4.0 | 10.2 | 22.2 |
| 2 | 9:47 | 4.1 | 10.2 | 22.0 |
| 2.5 | 9:48 | 4.1 | 10.2 | 21.8 |
| 3 | 9:48 | 4.1 | 10.2 | 21.8 |
| 3.5 | 9:49 | 4.0 | 10.2 | 22.0 |
| 4 | 9:49 | 4.2 | 10.3 | 22.0 |
| 4.5 | 9:50 | 4.1 | 10.2 | 22.0 |
| 5 | 9:50 | 4.1 | 10.3 | 22.0 |
| 5.5 | 9:51 | 3.9 | 10.4 | 22.0 |
| 6 | 9:51 | 4.0 | 10.3 | 21.8 |
| 6.5 | 9:52 | 4.2 | 10.3 | 22.0 |
| 7 | 9:52 | 4.1 | 10.2 | 22.2 |
| 7.5 | 9:53 | 4.1 | 10.2 | 22.4 |
| 8 | 9:53 | 4.1 | 10.3 | 22.2 |
| 8.5 | 9:54 | 4.2 | 10.2 | 22.2 |
| 9 | 9:54 | 4.0 | 10.2 | 22.2 |
| 9.5 | 9:55 | 3.9 | 10.3 | 22.2 |
| 10 | 9:55 | 4.1 | 10.2 | 22.0 |
| 10.5 | 9:56 | 4.1 | 10.3 | 22.0 |
| 11 | 9:57 | 4.1 | 10.3 | 22.0 |
| 11.5 | 9:57 | 4.1 | 10.3 | 22.2 |
| 12 | 9:58 | 4.2 | 10.3 | 22.2 |
| 12.5 | 9:58 | 4.1 | 10.3 | 22.0 |
| 13 | 9:59 | 4.0 | 10.3 | 22.0 |
| 13.5 | 9:59 | 4.1 | 10.3 | 22.0 |
| 14 | 10:00 | 4.1 | 10.3 | 22.0 |
| 14.5 | 10:00 | 4.2 | 10.2 | 22.0 |
| 15 | 10:01 | 4.2 | 10.2 | 22.0 |
| 15.5 | 10:01 | 4.1 | 10.3 | 22.2 |
| 16 | 10:02 | 4.2 | 10.3 | 22.2 |
| 16.5 | 10:02 | 4.1 | 10.3 | 22.2 |
| 17 | 10:03 | 3.9 | 10.3 | 22.0 |
| 17.5 | 10:03 | 3.9 | 10.3 | 22.2 |
| 18 | 10:04 | 4.1 | 10.4 | 22.0 |
| 18.5 | 10:04 | 4.1 | 10.4 | 22.0 |
| 19 | 10:05 | 4.0 | 10.3 | 22.0 |
| 19.5 | 10:05 | 4.1 | 10.3 | 22.0 |
| 20 | 10:06 | 4.2 | 10.3 | 22.0 |
| 20.5 | 10:06 | 4.1 | 10.3 | 22.0 |
| 21 | 10:07 | 4.1 | 10.4 | 21.8 |
| 21.5 | 10:07 | 4.07 | 10.38 | 21.7 |
| 22 | 10:08 | 4.16 | 10.29 | 21.49 |
| 22.5 | 10:08 | 4.01 | 10.28 | 21.7 |
| 23 | 10:09 | 4.06 | 10.36 | 21.69 |

Run 2

| | |
|------------|--------------|
| Start Time | 3/4/14 10:20 |
| Run Length | 21 |
| Stop Time | 10:41 |

| Gas Instrument Range Span Gas Value | | Calibration Information | | |
|---|-----------------------|------------------------------|-------------------------------|---------------------------------|
| | | O ₂ | CO ₂ | NO _x |
| Calibration | Span Gas Value | 9.8 | 19.7 | 39 |
| | | 4.90 | 10.00 | 18.2 |
| | Pretest Calibration | | | |
| | Zero% | 0.0 | 0.0 | 0.0 |
| | Span% | 4.8 | 10.0 | 18.0 |
| | Post Test Calibration | | | |
| | Zero% | -0.1 | 0.1 | 0.0 |
| | Span% | 4.9 | 10.0 | 18.2 |
| Results | | | | |
| Absolute Bias (Zero) | | 1.0% | 0.5% | 0.0% |
| Absolute Bias (Span) | | 1.0% | 0.5% | 1.0% |
| Absolute Drift (Zero) | | 1.0% | 0.5% | 0.0% |
| Absolute Drift (Span) | | 1.0% | 0.0% | 0.5% |
| | | | | |
| | | Corrected O ₂ % | Corrected CO ₂ % | Corrected NO _x ppm |
| | | 4.1 | 10.3 | 21.41 |
| Run Length (Minutes) | Time | Uncorrected O ₂ % | Uncorrected CO ₂ % | Uncorrected NO _x ppm |
| | | 4.1 | 10.3 | 21.3 |
| 0.5 | 10:20 | 4.0 | 10.2 | 21.0 |
| 1 | 10:20 | 4.1 | 10.2 | 21.4 |
| 1.5 | 10:21 | 4.0 | 10.2 | 21.8 |
| 2 | 10:21 | 4.0 | 10.2 | 21.4 |
| 2.5 | 10:22 | 4.2 | 10.3 | 21.4 |
| 3 | 10:22 | 4.0 | 10.3 | 21.2 |
| 3.5 | 10:23 | 4.1 | 10.3 | 21.2 |
| 4 | 10:23 | 4.0 | 10.2 | 21.4 |
| 4.5 | 10:24 | 4.1 | 10.3 | 21.4 |
| 5 | 10:24 | 4.1 | 10.3 | 21.2 |
| 5.5 | 10:25 | 4.1 | 10.3 | 21.0 |
| 6 | 10:25 | 4.1 | 10.3 | 21.0 |
| 6.5 | 10:26 | 4.2 | 10.2 | 21.0 |
| 7 | 10:26 | 4.1 | 10.3 | 21.2 |
| 7.5 | 10:27 | 4.0 | 10.4 | 21.0 |
| 8 | 10:27 | 4.1 | 10.3 | 21.0 |
| 8.5 | 10:28 | 4.2 | 10.3 | 21.4 |
| 9 | 10:28 | 4.1 | 10.3 | 21.4 |
| 9.5 | 10:29 | 3.9 | 10.3 | 21.4 |
| 10 | 10:29 | 4.1 | 10.4 | 21.4 |
| 10.5 | 10:30 | 4.2 | 10.4 | 21.0 |
| 11 | 10:30 | 4.1 | 10.3 | 21.4 |
| 11.5 | 10:31 | 3.9 | 10.3 | 21.6 |
| 12 | 10:31 | 4.0 | 10.4 | 21.4 |
| 12.5 | 10:32 | 4.2 | 10.4 | 21.2 |
| 13 | 10:32 | 4.2 | 10.3 | 21.4 |
| 13.5 | 10:33 | 4.0 | 10.5 | 21.4 |
| 14 | 10:33 | 4.0 | 10.4 | 21.0 |
| 14.5 | 10:34 | 4.2 | 10.4 | 21.0 |
| 15 | 10:34 | 4.1 | 10.3 | 21.0 |
| 15.5 | 10:35 | 4.1 | 10.3 | 21.2 |
| 16 | 10:35 | 4.1 | 10.4 | 21.4 |
| 16.5 | 10:36 | 4.3 | 10.3 | 21.6 |
| 17 | 10:36 | 4.1 | 10.4 | 21.4 |
| 17.5 | 10:37 | 3.9 | 10.5 | 21.2 |
| 18 | 10:37 | 4.1 | 10.4 | 21.2 |
| 18.5 | 10:38 | 4.2 | 10.3 | 21.4 |
| 19 | 10:39 | 4.2 | 10.3 | 21.6 |
| 19.5 | 10:39 | 4.1 | 10.4 | 21.6 |
| 20 | 10:40 | 4.1 | 10.3 | 21.4 |
| 20.5 | 10:40 | 4.2 | 10.4 | 21.4 |
| 21 | 10:41 | 4.1 | 10.4 | 21.6 |

Frontier Refining LLC
Frontier Refinery
Cheyenne, Wyoming
Crude Charge Heater
03/04/14

Run 3

| | |
|------------|--------------|
| Start Time | 3/4/14 10:58 |
| Run Length | 22 |
| Stop Time | 11:18 |

| | | Calibration Information | | |
|-----------------------|-------|------------------------------|-------------------------------|---------------------------------|
| Gas | | O ₂ | CO ₂ | NO _x |
| Instrument Range | | 8.8 | 19.7 | 39 |
| Span Gas Value | | 4.90 | 10.00 | 18.2 |
| Calibration | | | | |
| Pretest Calibration | | | | |
| Zero% | | -0.1 | 0.1 | 0.0 |
| Span% | | 4.9 | 10.0 | 18.2 |
| Post Test Calibration | | | | |
| Zero% | | 0.0 | 0.1 | 0.2 |
| Span% | | 4.8 | 10.0 | 18.0 |
| Results | | | | |
| Absolute Bias (Zero) | | 0.0% | 0.5% | 0.5% |
| Absolute Bias (Span) | | 2.0% | 0.5% | 1.5% |
| Absolute Drift (Zero) | | 1.0% | 0.0% | 0.5% |
| Absolute Drift (Span) | | 1.0% | 0.0% | 0.5% |
| | | Corrected O ₂ % | Corrected CO ₂ % | Corrected NO _x ppm |
| | | 4.1 | 10.4 | 21.5 |
| Run Length (Minutes) | Time | Uncorrected O ₂ % | Uncorrected CO ₂ % | Uncorrected NO _x ppm |
| | | 4.1 | 10.4 | 21.4 |
| 0.5 | 10:58 | 4.2 | 10.3 | 21.4 |
| 1 | 10:58 | 4.2 | 10.4 | 21.6 |
| 1.5 | 10:57 | 4.0 | 10.4 | 21.6 |
| 2 | 10:57 | 4.0 | 10.4 | 21.4 |
| 2.5 | 10:58 | 4.2 | 10.5 | 21.4 |
| 3 | 10:58 | 4.1 | 10.4 | 21.4 |
| 3.5 | 10:59 | 4.1 | 10.4 | 21.6 |
| 4 | 10:59 | 4.1 | 10.4 | 21.4 |
| 4.5 | 11:00 | 4.2 | 10.4 | 21.4 |
| 5 | 11:01 | 4.0 | 10.4 | 21.4 |
| 5.5 | 11:01 | 4.1 | 10.4 | 21.4 |
| 6 | 11:02 | 4.1 | 10.5 | 21.4 |
| 6.5 | 11:02 | 4.2 | 10.4 | 21.4 |
| 7 | 11:03 | 4.1 | 10.3 | 21.2 |
| 7.5 | 11:03 | 4.1 | 10.4 | 21.4 |
| 8 | 11:04 | 4.1 | 10.4 | 21.4 |
| 8.5 | 11:04 | 4.2 | 10.4 | 21.4 |
| 9 | 11:05 | 4.1 | 10.4 | 21.6 |
| 9.5 | 11:05 | 4.0 | 10.5 | 21.6 |
| 10 | 11:06 | 4.1 | 10.5 | 21.4 |
| 10.5 | 11:06 | 4.1 | 10.5 | 21.2 |
| 11 | 11:07 | 4.0 | 10.5 | 21.6 |
| 11.5 | 11:07 | 4.0 | 10.4 | 21.4 |
| 12 | 11:08 | 4.3 | 10.4 | 21.4 |
| 12.5 | 11:08 | 4.1 | 10.3 | 21.4 |
| 13 | 11:09 | 4.0 | 10.4 | 21.4 |
| 13.5 | 11:09 | 4.0 | 10.4 | 21.0 |
| 14 | 11:10 | 4.1 | 10.5 | 21.0 |
| 14.5 | 11:10 | 4.1 | 10.5 | 21.2 |
| 15 | 11:11 | 4.0 | 10.5 | 21.2 |
| 15.5 | 11:11 | 4.0 | 10.5 | 21.4 |
| 16 | 11:12 | 4.1 | 10.5 | 21.4 |
| 16.5 | 11:12 | 4.1 | 10.5 | 21.6 |
| 17 | 11:13 | 4.1 | 10.5 | 21.6 |
| 17.5 | 11:13 | 4.0 | 10.5 | 21.4 |
| 18 | 11:14 | 4.1 | 10.5 | 21.2 |
| 18.5 | 11:14 | 4.2 | 10.5 | 21.0 |
| 19 | 11:15 | 4.0 | 10.4 | 21.2 |
| 19.5 | 11:15 | 4.1 | 10.4 | 21.6 |
| 20 | 11:16 | 4.2 | 10.4 | 21.4 |
| 20.5 | 11:16 | 4.2 | 10.5 | 21.4 |
| 21 | 11:17 | 4.1 | 10.5 | 21.6 |
| 21.5 | 11:17 | 4.2 | 10.4 | 21.4 |
| 22 | 11:18 | 4.3 | 10.4 | 21.2 |

Frontier Refining LLC
Frontier Refinery
Cheyenne, Wyoming
Crude Charge Heater
03/04/14

Run 4

| | |
|------------|--------------|
| Start Time | 3/4/14 11:31 |
| Run Length | 22 |
| Stop Time | 11:53 |

| | | Calibration Information | | |
|-----------------------|-------|------------------------------|-------------------------------|---------------------------------|
| Gas | | O ₂ | CO ₂ | NO _x |
| Instrument Range | | 9.8 | 19.7 | 39 |
| Span Gas Value | | 4.90 | 10.00 | 18.2 |
| Calibration | | | | |
| Pretest Calibration | | | | |
| Zero% | | 0.0 | 0.1 | 0.2 |
| Span% | | 4.8 | 10.0 | 18.0 |
| Post Test Calibration | | | | |
| Zero% | | -0.1 | 0.1 | 0.2 |
| Span% | | 4.8 | 10.0 | 18.0 |
| Results | | | | |
| Absolute Bias (Zero) | | 1.0% | 0.5% | 0.5% |
| Absolute Bias (Span) | | 2.0% | 0.5% | 1.5% |
| Absolute Drift (Zero) | | 1.0% | 0.0% | 0.0% |
| Absolute Drift (Span) | | 0.0% | 0.0% | 0.0% |
| | | Corrected O ₂ % | Corrected CO ₂ % | Corrected NO _x ppm |
| | | 4.2 | 10.4 | 21.5 |
| Run Length (Minutes) | Time | Uncorrected O ₂ % | Uncorrected CO ₂ % | Uncorrected NO _x ppm |
| | | 4.1 | 10.4 | 21.3 |
| 0.5 | 11:31 | 4.1 | 10.3 | 21.2 |
| 1 | 11:31 | 4.0 | 10.3 | 21.2 |
| 1.5 | 11:32 | 4.2 | 10.4 | 21.6 |
| 2 | 11:32 | 4.2 | 10.4 | 21.2 |
| 2.5 | 11:33 | 4.1 | 10.4 | 21.0 |
| 3 | 11:33 | 4.0 | 10.4 | 21.2 |
| 3.5 | 11:34 | 4.2 | 10.5 | 21.2 |
| 4 | 11:34 | 4.2 | 10.4 | 21.4 |
| 4.5 | 11:35 | 4.1 | 10.4 | 21.6 |
| 5 | 11:35 | 4.1 | 10.5 | 21.6 |
| 5.5 | 11:36 | 4.1 | 10.5 | 21.6 |
| 6 | 11:36 | 4.1 | 10.5 | 21.4 |
| 6.5 | 11:37 | 4.1 | 10.5 | 21.0 |
| 7 | 11:37 | 4.1 | 10.5 | 21.2 |
| 7.5 | 11:38 | 4.2 | 10.4 | 21.4 |
| 8 | 11:38 | 4.1 | 10.3 | 21.4 |
| 8.5 | 11:39 | 4.0 | 10.3 | 21.2 |
| 9 | 11:39 | 4.2 | 10.3 | 21.6 |
| 9.5 | 11:40 | 4.3 | 10.4 | 21.6 |
| 10 | 11:40 | 4.2 | 10.4 | 21.6 |
| 10.5 | 11:41 | 3.9 | 10.5 | 21.2 |
| 11 | 11:41 | 4.0 | 10.6 | 21.2 |
| 11.5 | 11:42 | 4.2 | 10.4 | 21.2 |
| 12 | 11:43 | 4.2 | 10.4 | 21.4 |
| 12.5 | 11:43 | 4.0 | 10.5 | 21.2 |
| 13 | 11:44 | 4.1 | 10.4 | 21.4 |
| 13.5 | 11:44 | 4.2 | 10.4 | 21.4 |
| 14 | 11:45 | 4.1 | 10.5 | 21.4 |
| 14.5 | 11:45 | 3.9 | 10.5 | 21.2 |
| 15 | 11:46 | 4.0 | 10.5 | 21.0 |
| 15.5 | 11:46 | 4.0 | 10.5 | 21.2 |
| 16 | 11:47 | 4.0 | 10.5 | 21.0 |
| 16.5 | 11:47 | 4.1 | 10.5 | 21.0 |
| 17 | 11:48 | 4.0 | 10.5 | 21.0 |
| 17.5 | 11:48 | 4.1 | 10.5 | 21.0 |
| 18 | 11:49 | 4.0 | 10.4 | 21.0 |
| 18.5 | 11:49 | 4.1 | 10.4 | 21.2 |
| 19 | 11:50 | 4.1 | 10.4 | 21.4 |
| 19.5 | 11:50 | 4.1 | 10.5 | 21.4 |
| 20 | 11:51 | 4.1 | 10.4 | 21.2 |
| 20.5 | 11:51 | 4.1 | 10.4 | 21.2 |
| 21 | 11:52 | 4.1 | 10.3 | 21.2 |
| 21.5 | 11:52 | 4.4 | 10.3 | 21.4 |
| 22 | 11:53 | 4.1 | 10.4 | 21.4 |

Frontier Refining LLC
Frontier Refinery
Cheyenne, Wyoming
Crude Charge Heater
03/04/14

Run 5

| | |
|------------|--------------|
| Start Time | 3/4/14 12:03 |
| Run Length | 21 |
| Stop Time | 12:24 |

| | | Calibration Information | | |
|-----------------------|-------|------------------------------|-------------------------------|---------------------------------|
| Gas | | O ₂ | CO ₂ | NO _x |
| Instrument Range | | 9.5 | 19.7 | 39 |
| Span Gas Value | | 4.90 | 10.00 | 18.2 |
| Calibration | | | | |
| Pretest Calibration | | | | |
| Zero% | | -0.1 | 0.1 | 0.2 |
| Span% | | 4.8 | 10.0 | 18.0 |
| Post Test Calibration | | | | |
| Zero% | | 0.0 | 0.1 | 0.0 |
| Span% | | 4.9 | 10.0 | 18.0 |
| Results | | | | |
| Absolute Bias (Zero) | | 0.0% | 0.5% | 0.0% |
| Absolute Bias (Span) | | 1.0% | 0.5% | 1.5% |
| Absolute Drift (Zero) | | 1.0% | 0.0% | 0.5% |
| Absolute Drift (Span) | | 1.0% | 0.0% | 0.0% |
| | | Corrected O ₂ % | Corrected CO ₂ % | Corrected NO _x ppm |
| | | 4.1 | 10.4 | 21.6 |
| Run Length (Minutes) | Time | Uncorrected O ₂ % | Uncorrected CO ₂ % | Uncorrected NO _x ppm |
| | | 4.1 | 10.4 | 21.3 |
| 0.5 | 12:03 | 4.0 | 10.4 | 21.8 |
| 1 | 12:03 | 4.1 | 10.4 | 21.6 |
| 1.5 | 12:04 | 4.2 | 10.3 | 21.4 |
| 2 | 12:05 | 4.2 | 10.4 | 21.4 |
| 2.5 | 12:05 | 4.1 | 10.4 | 21.2 |
| 3 | 12:06 | 4.2 | 10.4 | 21.2 |
| 3.5 | 12:06 | 4.3 | 10.3 | 21.2 |
| 4 | 12:07 | 4.1 | 10.4 | 21.2 |
| 4.5 | 12:07 | 4.1 | 10.4 | 21.2 |
| 5 | 12:08 | 4.2 | 10.4 | 21.0 |
| 5.5 | 12:08 | 4.4 | 10.4 | 21.4 |
| 6 | 12:09 | 4.2 | 10.3 | 21.8 |
| 6.5 | 12:09 | 4.0 | 10.3 | 21.8 |
| 7 | 12:10 | 4.2 | 10.4 | 21.4 |
| 7.5 | 12:10 | 4.4 | 10.4 | 21.4 |
| 8 | 12:11 | 4.1 | 10.4 | 21.2 |
| 8.5 | 12:11 | 4.0 | 10.4 | 21.2 |
| 9 | 12:12 | 4.2 | 10.4 | 21.2 |
| 9.5 | 12:12 | 4.3 | 10.3 | 21.4 |
| 10 | 12:13 | 4.2 | 10.3 | 21.0 |
| 10.5 | 12:13 | 4.2 | 10.3 | 20.8 |
| 11 | 12:14 | 4.2 | 10.4 | 21.2 |
| 11.5 | 12:14 | 4.4 | 10.3 | 21.2 |
| 12 | 12:15 | 4.1 | 10.4 | 21.2 |
| 12.5 | 12:15 | 3.8 | 10.4 | 21.4 |
| 13 | 12:16 | 3.9 | 10.4 | 21.2 |
| 13.5 | 12:18 | 4.0 | 10.4 | 21.2 |
| 14 | 12:17 | 3.8 | 10.3 | 21.2 |
| 14.5 | 12:17 | 4.0 | 10.4 | 21.2 |
| 15 | 12:18 | 4.0 | 10.3 | 21.8 |
| 15.5 | 12:18 | 4.0 | 10.4 | 21.4 |
| 16 | 12:19 | 3.9 | 10.4 | 21.2 |
| 16.5 | 12:19 | 4.0 | 10.4 | 21.2 |
| 17 | 12:20 | 4.1 | 10.3 | 21.0 |
| 17.5 | 12:20 | 4.0 | 10.4 | 21.4 |
| 18 | 12:21 | 3.9 | 10.4 | 21.4 |
| 18.5 | 12:21 | 3.9 | 10.4 | 21.8 |
| 19 | 12:22 | 4.0 | 10.4 | 21.8 |
| 19.5 | 12:22 | 4.0 | 10.4 | 22.0 |
| 20 | 12:23 | 3.8 | 10.4 | 21.6 |
| 20.5 | 12:23 | 3.9 | 10.4 | 21.8 |
| 21 | 12:24 | 4.1 | 10.4 | 21.4 |

Frontier Refining LLC
Frontier Refinery
Cheyenne, Wyoming
Crude Charge Heater
03/04/14

Run 6

| | |
|------------|--------------|
| Start Time | 3/4/14 12:33 |
| Run Length | 21 |
| Stop Time | 12:54 |

| | | Calibration Information | | |
|-----------------------|-------|------------------------------|-------------------------------|---------------------------------|
| Gas | | O ₂ | CO ₂ | NO _x |
| Instrument Range | | 9.8 | 19.7 | 39 |
| Span Gas Value | | 4.90 | 10.00 | 19.2 |
| Calibration | | | | |
| Pretest Calibration | | | | |
| Zero% | | 0.0 | 0.1 | 0.0 |
| Span% | | 4.9 | 10.0 | 18.0 |
| Post Test Calibration | | | | |
| Zero% | | -0.1 | 0.1 | -0.2 |
| Span% | | 4.9 | 10.0 | 17.8 |
| Results | | | | |
| Absolute Bias (Zero) | | 1.0% | 0.5% | 0.5% |
| Absolute Bias (Span) | | 1.0% | 0.5% | 2.1% |
| Absolute Drift (Zero) | | 1.0% | 0.0% | 0.5% |
| Absolute Drift (Span) | | 0.0% | 0.0% | 0.5% |
| | | Corrected O ₂ % | Corrected CO ₂ % | Corrected NO _x ppm |
| | | 4.1 | 10.4 | 21.7 |
| Run Length (Minutes) | Time | Uncorrected O ₂ % | Uncorrected CO ₂ % | Uncorrected NO _x ppm |
| | | 4.1 | 10.4 | 21.3 |
| 0.5 | 12:33 | 3.9 | 10.4 | 21.2 |
| 1 | 12:33 | 3.9 | 10.4 | 21.2 |
| 1.5 | 12:34 | 4.0 | 10.4 | 21.4 |
| 2 | 12:34 | 4.2 | 10.4 | 21.2 |
| 2.5 | 12:35 | 4.0 | 10.5 | 21.6 |
| 3 | 12:35 | 4.0 | 10.4 | 21.4 |
| 3.5 | 12:36 | 4.1 | 10.4 | 21.4 |
| 4 | 12:36 | 4.2 | 10.5 | 21.2 |
| 4.5 | 12:37 | 4.0 | 10.5 | 21.2 |
| 5 | 12:37 | 4.0 | 10.5 | 21.4 |
| 5.5 | 12:38 | 4.1 | 10.4 | 21.6 |
| 6 | 12:38 | 4.1 | 10.4 | 21.4 |
| 6.5 | 12:39 | 4.0 | 10.5 | 21.0 |
| 7 | 12:39 | 4.0 | 10.4 | 21.2 |
| 7.5 | 12:40 | 4.2 | 10.4 | 21.2 |
| 8 | 12:40 | 4.1 | 10.4 | 21.4 |
| 8.5 | 12:41 | 3.9 | 10.4 | 21.4 |
| 9 | 12:41 | 4.0 | 10.5 | 21.0 |
| 9.5 | 12:42 | 4.0 | 10.8 | 21.0 |
| 10 | 12:42 | 4.0 | 10.4 | 21.2 |
| 10.5 | 12:43 | 4.0 | 10.4 | 21.0 |
| 11 | 12:43 | 4.1 | 10.4 | 21.2 |
| 11.5 | 12:44 | 4.2 | 10.4 | 21.2 |
| 12 | 12:44 | 4.1 | 10.4 | 21.4 |
| 12.5 | 12:45 | 4.0 | 10.4 | 21.4 |
| 13 | 12:45 | 4.0 | 10.5 | 21.2 |
| 13.5 | 12:46 | 4.1 | 10.5 | 21.4 |
| 14 | 12:47 | 4.1 | 10.4 | 21.4 |
| 14.5 | 12:47 | 3.9 | 10.3 | 21.4 |
| 15 | 12:48 | 4.0 | 10.3 | 21.4 |
| 15.5 | 12:48 | 4.4 | 10.3 | 21.8 |
| 16 | 12:49 | 4.0 | 10.4 | 21.8 |
| 16.5 | 12:49 | 3.9 | 10.4 | 21.2 |
| 17 | 12:50 | 4.0 | 10.3 | 21.2 |
| 17.5 | 12:50 | 4.2 | 10.2 | 21.2 |
| 18 | 12:51 | 4.1 | 10.2 | 21.4 |
| 18.5 | 12:51 | 4.0 | 10.2 | 21.6 |
| 19 | 12:52 | 4.2 | 10.2 | 21.6 |
| 19.5 | 12:52 | 4.2 | 10.2 | 21.2 |
| 20 | 12:53 | 4.1 | 10.2 | 20.8 |
| 20.5 | 12:53 | 4.1 | 10.2 | 21.0 |
| 21 | 12:54 | 4.1 | 10.1 | 22.2 |

Frontier Refining LLC
Frontier Refinery
Cheyenne, Wyoming
Crude Charge Heater
03/04/14

Run 7

| | |
|------------|--------------|
| Start Time | 3/4/14 13:02 |
| Run Length | 23 |
| Stop Time | 13:25 |

| | | Calibration Information | | |
|-----------------------|-------|------------------------------|-------------------------------|---------------------------------|
| Gas | | O ₂ | CO ₂ | NO _x |
| Instrument Range | | 9.8 | 19.7 | 39 |
| Span Gas Value | | 4.90 | 10.00 | 18.2 |
| Calibration | | | | |
| Pretest Calibration | | | | |
| Zero% | | -0.1 | 0.1 | -0.2 |
| Span% | | 4.9 | 10.0 | 17.8 |
| Post Test Calibration | | | | |
| Zero% | | 0.0 | 0.1 | -0.4 |
| Span% | | 4.9 | 10.0 | 17.8 |
| Results | | | | |
| Absolute Bias (Zero) | | 0.0% | 0.5% | 1.0% |
| Absolute Bias (Span) | | 1.0% | 0.5% | 2.1% |
| Absolute Drift (Zero) | | 1.0% | 0.0% | 0.5% |
| Absolute Drift (Span) | | 0.0% | 0.0% | 0.0% |
| | | Corrected O ₂ % | Corrected CO ₂ % | Corrected NO _x ppm |
| | | 4.1 | 10.3 | 22.2 |
| Run Length (Minutes) | Time | Uncorrected O ₂ % | Uncorrected CO ₂ % | Uncorrected NO _x ppm |
| | | 4.1 | 10.3 | 21.8 |
| 0.5 | 13:02 | 4.2 | 10.2 | 22.0 |
| 1 | 13:02 | 4.0 | 10.4 | 21.6 |
| 1.5 | 13:03 | 3.9 | 10.4 | 21.4 |
| 2 | 13:03 | 4.0 | 10.3 | 21.6 |
| 2.5 | 13:04 | 4.2 | 10.3 | 21.6 |
| 3 | 13:04 | 4.1 | 10.3 | 22.0 |
| 3.5 | 13:05 | 4.0 | 10.3 | 21.8 |
| 4 | 13:05 | 4.0 | 10.3 | 22.2 |
| 4.5 | 13:06 | 4.2 | 10.4 | 22.2 |
| 5 | 13:06 | 4.1 | 10.5 | 22.2 |
| 5.5 | 13:07 | 4.0 | 10.5 | 22.0 |
| 6 | 13:07 | 4.1 | 10.4 | 22.0 |
| 6.5 | 13:08 | 4.1 | 10.4 | 22.2 |
| 7 | 13:08 | 4.0 | 10.3 | 22.4 |
| 7.5 | 13:09 | 3.8 | 10.4 | 22.1 |
| 8 | 13:10 | 4.0 | 10.4 | 22.0 |
| 8.5 | 13:10 | 4.1 | 10.5 | 21.6 |
| 9 | 13:11 | 3.9 | 10.4 | 21.2 |
| 9.5 | 13:11 | 4.0 | 10.4 | 21.6 |
| 10 | 13:12 | 4.1 | 10.4 | 21.4 |
| 10.5 | 13:12 | 4.3 | 10.5 | 21.6 |
| 11 | 13:13 | 4.0 | 10.4 | 21.2 |
| 11.5 | 13:13 | 4.0 | 10.4 | 21.6 |
| 12 | 13:14 | 4.1 | 10.3 | 21.8 |
| 12.5 | 13:14 | 4.2 | 10.4 | 22.0 |
| 13 | 13:15 | 4.0 | 10.3 | 21.4 |
| 13.5 | 13:15 | 4.0 | 10.3 | 21.6 |
| 14 | 13:16 | 4.1 | 10.3 | 21.6 |
| 14.5 | 13:16 | 4.2 | 10.3 | 21.6 |
| 15 | 13:17 | 4.1 | 10.4 | 22.0 |
| 15.5 | 13:17 | 4.1 | 10.3 | 21.4 |
| 16 | 13:18 | 4.2 | 10.2 | 21.6 |
| 16.5 | 13:18 | 4.2 | 10.3 | 22.0 |
| 17 | 13:19 | 4.1 | 10.2 | 21.8 |
| 17.5 | 13:19 | 4.1 | 10.3 | 21.8 |
| 18 | 13:20 | 4.2 | 10.3 | 21.6 |
| 18.5 | 13:20 | 4.1 | 10.2 | 21.6 |
| 19 | 13:21 | 4.0 | 10.3 | 21.8 |
| 19.5 | 13:21 | 4.1 | 10.3 | 21.8 |
| 20 | 13:22 | 4.2 | 10.3 | 21.6 |
| 20.5 | 13:22 | 4.2 | 10.2 | 22.0 |
| 21 | 13:23 | 4.1 | 10.2 | 21.8 |
| 21.5 | 13:23 | 4.1 | 10.4 | 21.8 |
| 22 | 13:24 | 4.1 | 10.2 | 21.6 |
| 22.5 | 13:24 | 4.3 | 10.3 | 21.4 |
| 23 | 13:25 | 4.0 | 10.3 | 21.8 |

Frontier Refining LLC
Frontier Refinery
Cheyenne, Wyoming
Crude Charge Heater
03/04/14

Run 8

| | |
|------------|--------------|
| Start Time | 3/4/14 13:33 |
| Run Length | 22 |
| Stop Time | 13:55 |

| | | Calibration Information | | |
|-----------------------|-------|------------------------------|-------------------------------|---------------------------------|
| Gas | | O ₂ | CO ₂ | NO _x |
| Instrument Range | | 9.8 | 19.7 | 39 |
| Span Gas Value | | 4.90 | 10.00 | 18.2 |
| Calibration | | | | |
| Pretest Calibration | | | | |
| Zero% | | 0.0 | 0.1 | -0.4 |
| Span% | | 4.9 | 10.0 | 17.8 |
| Post Test Calibration | | | | |
| Zero% | | -0.1 | 0.1 | -0.2 |
| Span% | | 4.9 | 10.0 | 18.0 |
| Results | | | | |
| Absolute Bias (Zero) | | 1.0% | 0.5% | 0.5% |
| Absolute Bias (Span) | | 1.0% | 0.5% | 1.5% |
| Absolute Drift (Zero) | | 1.0% | 0.0% | 0.5% |
| Absolute Drift (Span) | | 0.0% | 0.0% | 0.5% |
| | | Corrected O ₂ % | Corrected CO ₂ % | Corrected NO _x ppm |
| | | 4.1 | 10.3 | 21.7 |
| Run Length (Minutes) | Time | Uncorrected O ₂ % | Uncorrected CO ₂ % | Uncorrected NO _x ppm |
| | | 4.1 | 10.3 | 21.4 |
| 0.5 | 13:33 | 4.1 | 10.3 | 21.5 |
| 1 | 13:33 | 4.1 | 10.4 | 21.2 |
| 1.5 | 13:34 | 4.3 | 10.3 | 21.2 |
| 2 | 13:34 | 4.2 | 10.3 | 21.6 |
| 2.5 | 13:35 | 4.1 | 10.4 | 21.2 |
| 3 | 13:35 | 4.0 | 10.4 | 21.0 |
| 3.5 | 13:36 | 4.2 | 10.3 | 21.4 |
| 4 | 13:36 | 4.2 | 10.3 | 21.8 |
| 4.5 | 13:37 | 4.1 | 10.3 | 21.8 |
| 5 | 13:37 | 4.2 | 10.3 | 21.6 |
| 5.5 | 13:38 | 4.1 | 10.3 | 21.4 |
| 6 | 13:38 | 4.3 | 10.3 | 21.4 |
| 6.5 | 13:39 | 4.1 | 10.3 | 21.6 |
| 7 | 13:39 | 4.1 | 10.2 | 21.6 |
| 7.5 | 13:40 | 4.2 | 10.3 | 21.8 |
| 8 | 13:40 | 4.2 | 10.4 | 21.6 |
| 8.5 | 13:41 | 4.1 | 10.3 | 21.4 |
| 9 | 13:41 | 4.2 | 10.3 | 21.4 |
| 9.5 | 13:42 | 4.3 | 10.3 | 21.4 |
| 10 | 13:42 | 4.2 | 10.3 | 21.4 |
| 10.5 | 13:43 | 4.2 | 10.3 | 21.4 |
| 11 | 13:43 | 4.1 | 10.3 | 21.4 |
| 11.5 | 13:44 | 4.2 | 10.3 | 21.6 |
| 12 | 13:44 | 4.2 | 10.3 | 21.4 |
| 12.5 | 13:45 | 4.1 | 10.3 | 21.2 |
| 13 | 13:45 | 4.0 | 10.2 | 21.4 |
| 13.5 | 13:46 | 4.2 | 10.3 | 21.4 |
| 14 | 13:46 | 4.1 | 10.3 | 21.6 |
| 14.5 | 13:47 | 4.0 | 10.3 | 21.2 |
| 15 | 13:47 | 4.1 | 10.3 | 21.4 |
| 15.5 | 13:48 | 4.2 | 10.2 | 21.2 |
| 16 | 13:48 | 4.1 | 10.3 | 21.4 |
| 16.5 | 13:49 | 4.1 | 10.3 | 21.4 |
| 17 | 13:49 | 4.1 | 10.3 | 21.6 |
| 17.5 | 13:50 | 4.2 | 10.3 | 21.6 |
| 18 | 13:51 | 4.2 | 10.3 | 21.4 |
| 18.5 | 13:51 | 4.1 | 10.2 | 21.4 |
| 19 | 13:52 | 4.2 | 10.3 | 21.6 |
| 19.5 | 13:52 | 4.2 | 10.3 | 21.6 |
| 20 | 13:53 | 4.1 | 10.3 | 21.4 |
| 20.5 | 13:53 | 4.0 | 10.3 | 21.2 |
| 21 | 13:54 | 4.2 | 10.3 | 21.6 |
| 21.5 | 13:54 | 4.2 | 10.3 | 21.4 |
| 22 | 13:55 | 4.2 | 10.3 | 21.0 |

Run 9

| | |
|------------|--------------|
| Start Time | 3/4/14 14:04 |
| Run Length | 21 |
| Stop Time | 14:25 |

Mutation Testing, Inc.

Frontier Refining LLC
Frontier Refinery
Cheyenne, Wyoming
Crude Charge Heater
03/04/14

Run 10

| | |
|------------|--------------|
| Start Time | 3/4/14 14:40 |
| Run Length | 21 |
| Stop Time | 15:01 |

| | | Calibration Information | | |
|-----------------------|-------|------------------------------|-------------------------------|---------------------------------|
| Gas | | O ₂ | CO ₂ | NO _x |
| Instrument Range | | 9.8 | 19.7 | 39 |
| Span Gas Value | | 4.90 | 10.00 | 18.2 |
| Calibration | | | | |
| Pretest Calibration | | | | |
| Zero% | | 0.0 | 0.1 | -0.4 |
| Span% | | 4.9 | 10.0 | 17.8 |
| Post Test Calibration | | | | |
| Zero% | | -0.1 | 0.1 | 0.0 |
| Span% | | 5.0 | 10.0 | 17.8 |
| Results | | | | |
| Absolute Bias (Zero) | | 1.0% | 0.5% | 0.0% |
| Absolute Bias (Span) | | 0.0% | 0.5% | 2.1% |
| Absolute Drift (Zero) | | 1.0% | 0.0% | 1.0% |
| Absolute Drift (Span) | | 1.0% | 0.0% | 0.0% |
| | | Corrected O ₂ % | Corrected CO ₂ % | Corrected NO _x ppm |
| | | 4.1 | 10.4 | 21.8 |
| Run Length (Minutes) | Time | Uncorrected O ₂ % | Uncorrected CO ₂ % | Uncorrected NO _x ppm |
| | | 4.1 | 10.4 | 21.2 |
| 0.5 | 14:40 | 4.1 | 10.4 | 21.3 |
| 1 | 14:40 | 4.2 | 10.5 | 21.2 |
| 1.5 | 14:41 | 4.0 | 10.4 | 21.2 |
| 2 | 14:41 | 4.0 | 10.5 | 21.0 |
| 2.5 | 14:42 | 4.2 | 10.5 | 21.0 |
| 3 | 14:42 | 4.1 | 10.4 | 21.2 |
| 3.5 | 14:43 | 4.1 | 10.5 | 21.4 |
| 4 | 14:43 | 4.1 | 10.4 | 21.8 |
| 4.5 | 14:44 | 4.2 | 10.5 | 21.8 |
| 5 | 14:44 | 4.1 | 10.5 | 21.4 |
| 5.5 | 14:45 | 4.0 | 10.5 | 21.4 |
| 6 | 14:45 | 4.0 | 10.5 | 21.0 |
| 6.5 | 14:46 | 4.3 | 10.4 | 21.2 |
| 7 | 14:46 | 4.3 | 10.4 | 21.4 |
| 7.5 | 14:47 | 4.1 | 10.5 | 21.4 |
| 8 | 14:47 | 4.0 | 10.5 | 21.4 |
| 8.5 | 14:48 | 4.1 | 10.4 | 21.0 |
| 9 | 14:48 | 4.1 | 10.8 | 21.2 |
| 9.5 | 14:49 | 4.1 | 10.4 | 21.4 |
| 10 | 14:49 | 4.0 | 10.4 | 21.2 |
| 10.5 | 14:50 | 4.3 | 10.4 | 21.2 |
| 11 | 14:50 | 4.1 | 10.4 | 20.8 |
| 11.5 | 14:51 | 4.1 | 10.4 | 21.0 |
| 12 | 14:51 | 4.2 | 10.4 | 21.0 |
| 12.5 | 14:52 | 4.4 | 10.3 | 20.8 |
| 13 | 14:52 | 4.2 | 10.5 | 21.0 |
| 13.5 | 14:53 | 4.0 | 10.5 | 21.0 |
| 14 | 14:53 | 4.1 | 10.4 | 21.2 |
| 14.5 | 14:54 | 4.2 | 10.4 | 21.0 |
| 15 | 14:55 | 4.2 | 10.4 | 21.2 |
| 15.5 | 14:55 | 4.0 | 10.5 | 21.0 |
| 16 | 14:56 | 4.2 | 10.4 | 21.0 |
| 16.5 | 14:56 | 4.2 | 10.4 | 21.2 |
| 17 | 14:57 | 4.2 | 10.4 | 21.2 |
| 17.5 | 14:57 | 4.0 | 10.4 | 21.2 |
| 18 | 14:58 | 4.0 | 10.5 | 20.8 |
| 18.5 | 14:58 | 4.3 | 10.4 | 21.0 |
| 19 | 14:59 | 4.1 | 10.4 | 21.0 |
| 19.5 | 14:59 | 4.1 | 10.4 | 21.2 |
| 20 | 15:00 | 4.2 | 10.5 | 21.2 |
| 20.5 | 15:00 | 4.3 | 10.4 | 21.0 |
| 21 | 15:01 | 4.1 | 10.4 | 21.0 |

Sample Calculations

Frontier Refining LLC
 Frontier Refinery
 Cheyenne, Wyoming
 Crude Charge Heater, Run 1
 3/4/2014

EPA Methods 1-4: Determination of Stack Gas Velocity and Volumetric Flow Rate

Sample Calculations

$$\begin{aligned}
 \text{sample volume (scf)} &= \frac{17.64 * V_M * Y_D * (P_B + \Delta H/13.6)}{T_M + 460} \\
 &= \frac{17.64 * 58.463 * 1.017 * (23.83 + 1.0 / 13.6)}{48 + 460} \\
 &= 49.345 \\
 \text{moisture volume (scf)} &= 0.04715 * V_{LC} \\
 &= 0.04715 * 174.1 \\
 &= 8.209 \\
 \text{moisture content (\% / 100)} &= \frac{V_{W(STD)}}{(V_{M(STD)} + V_{W(STD)})} \\
 &= \frac{8.209}{(49.345 + 8.209)} \\
 &= 0.143 \\
 \text{molecular weight, dry (grams/mol)} &= (0.440) * (\%CO_2) + (0.320) * (\%O_2) + (0.280) * (\%N_2 + \%CO) \\
 &= (0.440) * 10.2 + (0.320) * 4.1 + (0.280) * (85.7 + 0.0) \\
 &= 29.80 \\
 \text{molecular weight, actual (grams/mol)} &= M_D * (1 - B_{WS}) + (18.0) * B_{WS} \\
 &= 29.80 * (1 - 0.143) + (18 * 0.143) \\
 &= 28.12
 \end{aligned}$$

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 Crude Charge Heater, Run 1
 3/4/2014

EPA Methods 1-4: Determination of Stack Gas Velocity and Volumetric Flow Rate

Sample Calculations (continued)

$$\begin{aligned} \text{gas velocity (ft/sec)} &= 85.49 \cdot C_p \cdot \sqrt{\Delta P_{AVG}} \cdot \sqrt{\frac{T_g + 460}{(P_B + P_g / 13.6) \cdot M_A}} \\ &= (85.49) \cdot 0.837 \cdot 0.2425 \cdot \sqrt{\frac{312 + 460}{23.63 + \frac{0.10}{13.6}}} \cdot 28.12 \\ &= 18.6 \end{aligned}$$

$$\begin{aligned} \text{gas flow (acfm)} &= 60 \cdot \frac{\pi \cdot (D_B / 12)^2}{4} \cdot V_B \\ &= 60 \cdot \frac{\pi \cdot (102 / 12)^2}{4} \cdot 18.6 \\ &= 63,404 \end{aligned}$$

$$\begin{aligned} \text{gas flow (scfm)} &= 60 \cdot V_B \cdot (1 - B_{WB}) \cdot \frac{\pi \cdot (D_B / 12)^2}{4} \cdot \frac{T_{STD} \cdot (P_B + P_g / 13.6)}{(T_B + 460) \cdot P_{STD}} \\ &= 60 \cdot 18.6 \cdot (1 - 0.143) \cdot \frac{\pi \cdot (102.0 / 12)^2}{4} \cdot \frac{528 \cdot (23.63 + 0.10 / 13.6)}{(312 + 460) \cdot 29.92} \\ &= 29,621 \end{aligned}$$

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3/4/2014

EPA Methods 1-4: Determination of Stack Gas Velocity and Volumetric Flow Rate

Variables and Abbreviations

B_{WS} - moisture content of the gas (wet volume percent/100)

%CO - carbon monoxide content of the gas (dry volume percent)

%CO₂ - carbon dioxide content of the gas (dry volume percent)

C_p - pitot tube constant (unitless)

D_s - diameter of the stack (inches)

ΔH - pressure differential at dry gas meter exit orifice (inches water)

M_D - molecular weight of the dry gas (grams per mol)

M_A - molecular weight of the wet gas (grams per mol)

%N₂ - nitrogen content of the gas (dry volume percent)

%O₂ - oxygen content of the gas (dry volume percent)

P_{Avg} - average square root of the stack gas pitot differential pressure (inches water)

P_B - barometric pressure (inches mercury)

P_S - stack pressure relative to barometric pressure (inches water)

P_{STD} - standard pressure (29.92 inches mercury)

T_M - average dry gas meter temperature (°F)

T_S - average stack temperature (°F)

T_{STD} - standard temperature (528 °R)

V_{LG} - volume of moisture collected as a liquid (milliliters)

V_M - volume indicated on dry gas meter (uncorrected actual cubic feet)

V_{MSTD} - volume of gas through dry gas meter (corrected dry standard cubic feet)

V_S - stack gas velocity (feet per second)

V_{WSTD} - volume of moisture collected as a gas at standard conditions (standard cubic feet)

Y_D - dry gas meter calibration factor (unitless)

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Cheyenne, Wyoming
Crude Charge Heater, Run 1
3/4/2014

**EPA Method 3A: Determination of O₂ / CO₂ Concentrations in Emissions
from Stationary Sources (Instrumental Analyzer Procedure)**

Sample Calculations

$$\begin{aligned}\text{CO}_2 \text{ conc, drift cal (\%vd)} &= \frac{(\%FS_{\text{STACK}} - \%FS_0) * [\text{Span Gas Conc (\%vd)}]}{(\%FS_{\text{SPAN}} - \%FS_0)} \\ &= \frac{(10.3 - 0.0) * (10.0)}{(10.05) - (0.0)} \\ &= 10.2\end{aligned}$$

$$\begin{aligned}\text{O}_2 \text{ conc, drift cal (\%vd)} &= \frac{(\%FS_{\text{STACK}} - \%FS_0) * [\text{Span Gas Conc (\%vd)}]}{(\%FS_{\text{SPAN}} - \%FS_0)} \\ &= \frac{(4.1 - 0.05) * (4.9)}{(4.9) - (0.05)} \\ &= 4.1\end{aligned}$$

Variables and Abbreviations

cal - calibrated

conc - concentration

CO₂ - Carbon Dioxide

O₂ - Oxygen

%FS_{SPAN} - average analyzer reading for span gas (percent of full scale)

%FS_{STACK} - average analyzer reading for stack gas (percent of full scale)

%FS₀ - average analyzer reading for zero gas (percent of full scale)

%vd- dry volume percent

Frontier Refining LLC
 Frontier Refinery
 Cheyenne, Wyoming
 Crude Charge Heater, Run 1
 3/4/2014

EPA Method 7E: Determination of Nitrogen Oxides Emissions from Stationary Sources (Instrumental Analyzer Procedure)

Sample Calculations

$$\begin{aligned} \text{NO}_x \text{ conc, drift cal (ppmvd)} &= \frac{(\%FS_{\text{STACK}} - \%FS_0) * [\text{Span Gas Conc (ppmvd)}]}{(\%FS_{\text{SPAN}} - \%FS_0)} \\ &= \frac{(22.0 - 0.0) * (18.2)}{(18.5) - (0.0)} \\ &= 21.7 \end{aligned}$$

$$\begin{aligned} \text{NO}_x \text{ emissions (lb/hr)} &= [\text{NO}_x \text{ (ppmvd)}] * (F_{\text{DSCFM}}) * (1.556 \times 10^{-7}) * (46.01) \\ &= (21.7) * 29,621 * (1.556 \times 10^{-7}) * (46.01) \\ &= 4.59 \end{aligned}$$

$$\begin{aligned} \text{NO}_x \text{ emissions (lb/MMBtu)} &= \frac{([\text{NO}_x \text{ conc, drift cal (ppmvd)}] * [1.194 \times 10^{-7}] * [Fd] * 20.9)}{[20.9 - O_2]} \\ &= \frac{((21.7) * [1.194 \times 10^{-7}] * [8,543] * 20.9)}{[20.9 - 4.1]} \\ &= 0.027 \end{aligned}$$

Variables and Abbreviations

cal - calibrated

conc - concentration

F_{DSCFM} - gas flow (dry standard cubic feet per minute, where standard = 29.92 inches Hg and 68°F)

$\%FS_{\text{SPAN}}$ - average analyzer reading for span gas at probe tip (percent of full scale)

$\%FS_{\text{STACK}}$ - average analyzer reading for stack gas (percent of full scale)

$\%FS_0$ - average analyzer reading for zero gas at probe tip (percent of full scale)

lb/hr - pounds per hour

ppmvd - parts per million, dry volume basis

lb/MMBtu - pounds per million British thermal units

Appendix 2

Field Data

Poor Quality Source Document

The following document
images have been
scanned from the best
available source copy.

To view the actual hard copy,
contact the Region VIII Records
Center at (303) 312-6473.

Air Pollution Testing, Inc. : Analyzer Calibration Datasheet

| | | | |
|-----------|----------------------|------------|----------|
| Facility: | Exxon Refining LLC | Date: | 2/11/14 |
| Location: | Chrysalis, NY | APT Job #: | CRG 3531 |
| Unit: | Circle Charge Heater | Page #: | |

Analyzer Information

| | | | | | | |
|-------------------|---------|---------|--------|--|--|--|
| Analyzer Type | O_2 | CO_2 | NOx | | | |
| Analyzer ID # | 11201-1 | 14151-4 | 421-1 | | | |
| Analyzer Scale | 0-25 | 0-20 | 0-200 | | | |
| Calibration Range | 0-9.83 | 0-19.7 | 0-38.9 | | | |

Calibration Gas Cylinder Information (Cylinder ID#/Expiration date and Concentration)

| | | | | | | |
|-----------------|------------|------------|------------|--|--|--|
| Analyzer Type | O_2 | CO_2 | NOx | | | |
| Zero | | | | | | |
| CC# | | | | | | |
| Expiration date | | | | | | |
| Low | 4.90 | 4.98 | | | | |
| CC# | ALM0081609 | ALM0081609 | | | | |
| Expiration date | 2/5/21 | 2/5/21 | | | | |
| Mid | 9.83 | 10.0 | 18.2 | | | |
| CC# | 1L2250 | 1L2250 | AA1073323 | | | |
| Expiration date | 12/5/21 | 12/5/21 | 10/1/16 | | | |
| High | 21.1 | 19.3 | 38.9 | | | |
| CC# | ALM0882611 | ALM0882611 | ALM0416779 | | | |
| Expiration date | 5/22/21 | 5/22/21 | 10/1/16 | | | |

Calibration Error

| | | | | | | |
|---------------|-------|--------|-------|--|--|--|
| Analyzer Type | O_2 | CO_2 | NOx | | | |
| Zero | 0.0 | 0.0 | 0.0 | | | |
| Low | 5.0 | 5.1 | | | | |
| Mid | 10.0 | 10.1 | 18.1 | | | |
| High | 21.2 | 19.7 | 38.8 | | | |

Initial Bias Check

| | | | | | | |
|----------------------|---------|--------|--------|--|--|--|
| Analyzer Type | O_2 | CO_2 | NOx | | | |
| Zero | 0.1 | 0.0 | 0.0 | | | |
| Low | 5.0 | 5.1 | | | | |
| Mid | 10.0 | 10.1 | 18.0 | | | |
| High | | | | | | |
| system response time | 6.0 sec | 60 sec | 60 sec | | | |

Air Pollution Testing, Inc. : Analyzer Calibration Datasheet

Facility: Frontier Refining LLC

Date: 3/5/14

Location: Cheyenne, WY

APT Job #: 1503311

Unit: (Indic Change Unit)

Page #:

Run #: 1

Start Time: 946

Stop Time: 1004

Calibration Results

| Analyzer Type | O ₂ | CO ₂ | NO _x | | | |
|---------------|----------------|-----------------|-----------------|--|--|--|
| Zero | 0.0 | 0.0 | 0.0 | | | |
| Low | | | | | | |
| Mid | 4.8 | 10.0 | 18.0 | | | |
| High | | | | | | |

Run #: 2

Start Time: 1020

Stop Time: 1111

Calibration Results

| Analyzer Type | O ₂ | CO ₂ | NO _x | | | |
|---------------|----------------|-----------------|-----------------|--|--|--|
| Zero | -0.1 | 0.1 | 0.0 | | | |
| Low | | | | | | |
| Mid | 4.9 | 10.0 | 18.2 | | | |
| High | | | | | | |

Run #: 3

Start Time: 1056

Stop Time: 1118

Calibration Results

| Analyzer Type | O ₂ | CO ₂ | NO _x | | | |
|---------------|----------------|-----------------|-----------------|--|--|--|
| Zero | 0.0 | 0.1 | 0.2 | | | |
| Low | | | | | | |
| Mid | 4.8 | 10.0 | 18.0 | | | |
| High | | | | | | |

| Analyzer Type | O ₂ | CO ₂ | NO _x | | | |
|---------------|----------------|-----------------|-----------------|--|--|--|
| Zero | -0.1 | 0.0 | 0.2 | | | |
| Low | | | | | | |
| Mid | 4.8 | 10.0 | | | | |
| High | | | | | | |

Run #: 5 Start Time: 1203 Stop Time: 1224

Calibration Results

| Analyzer Type | O ₂ | CO ₂ | NO _x | | | |
|---------------|----------------|-----------------|-----------------|--|--|--|
| Zero | 0.0 | 0.1 | 0.0 | | | |
| Low | | | | | | |
| Mid | 4.9 | 10.0 | | | | |
| High | | | | | | |

Run #: 6 Start Time: 1233 Stop Time: 1251

Calibration Results

| Analyzer Type | O ₂ | CO ₂ | NO _x | | | |
|---------------|----------------|-----------------|-----------------|--|--|--|
| Zero | 1 | 1 | -0.2 | | | |
| Low | | | | | | |
| Mid | | | 17.8 | | | |
| High | | | | | | |

Air Pollution Testing, Inc. : Analyzer Calibration Datasheet

Facility : Frontier Refining LLC

Date : 3/5/14

Location : Mayhew, NY

APT Job # : 1, 20, 33, 1

Unit : Condenser Header

Page # :

Run # :

7

Start Time :

1302

Stop Time :

1325

Calibration Results

| Analyzer Type | O ₂ | CO ₂ | NO _x | | | |
|---------------|----------------|-----------------|-----------------|--|--|--|
| Zero | 0.0 | 0.1 | -0.4 | | | |
| Low | | | | | | |
| Mid | 4.9 | 10.0 | 17.8 | | | |
| High | | | | | | |

Run # :

8

Start Time :

1333

Stop Time :

1355

Calibration Results

| Analyzer Type | O ₂ | CO ₂ | NO _x | | | |
|---------------|----------------|-----------------|-----------------|--|--|--|
| Zero | -0.1 | 0.1 | -0.2 | | | |
| Low | | | | | | |
| Mid | 4.9 | 10.0 | 18.0 | | | |
| High | | | | | | |

Run # :

9

Start Time :

1404

Stop Time :

1425

Calibration Results

| Analyzer Type | O ₂ | CO ₂ | NO _x | | | |
|---------------|----------------|-----------------|-----------------|--|--|--|
| Zero | 0.0 | 0.1 | -0.4 | | | |
| Low | | | | | | |
| Mid | 4.9 | 10.0 | 17.8 | | | |
| High | | | | | | |

Air Pollution Testing, Inc. : Analyzer Calibration Datasheet

Facility : Lawrence Refining, LLC

Date : 3/5/14

Location : Chryseum, WY

APT Job # : F120 3331

Unit : Crude Charge Heater

Page # :

Run # : 10

Start Time : 1440

Stop Time : 1501

Calibration Results

| Analyzer Type | <u>O₂</u> | <u>CO</u> | <u>NO_x</u> | | | |
|---------------|----------------------|-------------|-----------------------|--|--|--|
| Zero | <u>-0.1</u> | <u>0.1</u> | <u>0.0</u> | | | |
| Low | | | | | | |
| Mid | <u>5.0</u> | <u>10.0</u> | <u>17.8</u> | | | |
| High | | | | | | |

Run # :

Start Time :

Stop Time :

Calibration Results

| Analyzer Type | | | | | | |
|---------------|--|--|--|--|--|--|
| Zero | | | | | | |
| Low | | | | | | |
| Mid | | | | | | |
| High | | | | | | |

Run # :

Start Time :

Stop Time :

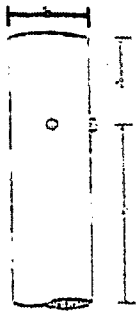
Calibration Results

| Analyzer Type | | | | | | |
|---------------|--|--|--|--|--|--|
| Zero | | | | | | |
| Low | | | | | | |
| Mid | | | | | | |
| High | | | | | | |

FR03331 Run 1

Air Pollution Testing, Inc. : EPA Method 4 - Moisture Determination Datasheet

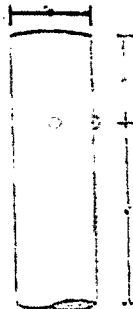
| | | | |
|--|---|--|-----------------------------------|
| APT Job #: FR03331 | Date: 3-4-14 | CO ₂ (%): CDA | O ₂ (%): CDA |
| Location: Soda Charger | Operator: SWILL/TK | Ambient Temperature (°F): | Barometric Press (mbar): 1012.807 |
| Run #: | Meter Box ID: M5-12 | Probe Length (ft): 3.5' | Moisture (grams): 174.1 |
| Meter Box Yr: 1.017 | Meter ΔH@: 1.53 | Static Pressure (°H ₂ O): 0.1 | Start Time: 9:46 |
| Pre-Test Pump Leak Check: 0.0 @ 15 in Hg | Post-Test Pump Leak Check: 0.0 @ 10 in Hg | Method: 41 | Stop Time: 11:16 |

| Sampling Time (minutes) | Vacuum (° Hg) | ΔH Orifice Setting (° H ₂ O) | T _m Meter Temp. | | Condenser Temp. (°F) | Probe Temp. (°F) | Meter Volume (ft ³) Initial Volume: 677.124 | Notes | Schematic of Stack: | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|---------------|---|----------------------------|-------------|----------------------|------------------|--|---------------|---|--|--|--|--------|------|-------|------|---|-------|-------|--|---|-------|-------|--|---|-------|-------|--|---|-------|-------|--|-------|--------|--------|-------|
| | | | Inlet (°F) | Outlet (°F) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | 3.5 | 1.0 | 48 | 50 | 37° | N/A | 680.344 | |  | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10 | 4.0 | 1.0 | 47 | 48 | 37° | | 683.767 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 15 | 4.5 | 1.0 | 47 | 48 | 37° | | 687.090 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 | 4.5 | 1.0 | 47 | 48 | 38° | | 690.372 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 25 | 4.5 | 1.0 | 47 | 47 | 38° | | 693.655 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 30 | 4.5 | 1.0 | 47 | 46 | 40° | | 696.938 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 35 | 4.5 | 1.0 | 48 | 46 | 40° | | 700.194 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 40 | 5.0 | 1.0 | 49 | 47 | 40° | | 703.450 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 45 | | 1.0 | 50 | 47 | 42° | | 706.691 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 50 | 5.0 | 1.0 | 51 | 49 | 42° | | 709.949 | 709.964 50000 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 55 | 5.0 | 1.0 | 51 | 49 | 42° | | 713.207 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 60 | 5.0 | 1.0 | 50 | 48 | 44° | | 716.448 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 65 | 5.0 | 1.0 | 48 | 48 | 44° | | 719.698 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 70 | 5.0 | 1.0 | 49 | 48 | 44° | | 722.925 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 75 | 5.0 | 1.0 | 48 | 48 | 44° | | 726.156 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 80 | 5.0 | 1.0 | 49 | 48 | 45° | | 729.241 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 85 | 5.0 | 1.0 | 49 | 47 | 45° | | 732.526 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 90 | 5.0 | 1.0 | 49 | 47 | 45° | | 735.597 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <div>Stack ID (Inches): 10.2</div> <div>Upstream Disturbance (Inches): 7 1/8"</div> <div>Downstream Disturbance (Inches): 2.0</div> <div>200 gram Field Check of Scale (value):</div> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <table border="1"> <thead> <tr> <th colspan="4">Moisture Determination</th> </tr> <tr> <th>Imp. #</th> <th>Tare</th> <th>Final</th> <th>Gain</th> </tr> </thead> <tbody> <tr><td>1</td><td>461.8</td><td>512.3</td><td></td></tr> <tr><td>2</td><td>476.0</td><td>507.8</td><td></td></tr> <tr><td>3</td><td>312.0</td><td>390.0</td><td></td></tr> <tr><td>4</td><td>488.6</td><td>502.4</td><td></td></tr> <tr><td>Total</td><td>1738.4</td><td>1912.5</td><td>174.1</td></tr> </tbody> </table> | | | | | | | | | Moisture Determination | | | | Imp. # | Tare | Final | Gain | 1 | 461.8 | 512.3 | | 2 | 476.0 | 507.8 | | 3 | 312.0 | 390.0 | | 4 | 488.6 | 502.4 | | Total | 1738.4 | 1912.5 | 174.1 |
| Moisture Determination | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Imp. # | Tare | Final | Gain | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | 461.8 | 512.3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | 476.0 | 507.8 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | 312.0 | 390.0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | 488.6 | 502.4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total | 1738.4 | 1912.5 | 174.1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| total | maximum | average | minimum | maximum | average | discrepancy | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 90 | 5.0 | 1.0 | 48.08 | 45° | N/A | 58.443 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Technician's Signature:

Project Leader's Signature:

FR 3331 Run 2

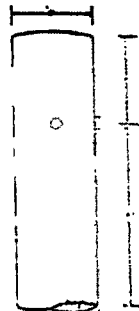
| Air Pollution Testing, Inc. : EPA Method 4 - Moisture Determination Datasheet | | | | | | | | | | | |
|---|--------------|---|----------------------------|---|----------------------|-----------------------------------|---|--|---|----------------------------|-------|
| APT Job #: FR 3331 | | Date: 3-4-14 | | CO ₂ (%): CDAI | | O ₂ (%): CDAI | | | | | |
| Location: Cross Chamber | | Operator: SWILL/SH | | Ambient Temperature (°F): | | Barometric Press (mbar): 1012.827 | | | | | |
| Run # 2 | | Meter Box ID: MS-12 | | Probe Length (ft): 3.5 | | Moisture (grams): 171.6 | | | | | |
| Meter Box Yr: 1013 | | Meter ΔH@: 1.53 | | Static Pressure (°H ₂ O): .1 | | Start Time: 11:31 | | | | | |
| Pre-Test Pump Leak Check: 0.00215 H ₂ | | Post-Test Pump Leak Check: 0.00210 H ₂ | | Method: 4 | | Stop Time: 13:01 | | | | | |
| Sampling Time (minutes) | Vacuum (°Hg) | ΔH Orifice Setting (°H ₂ O) | T _m Meter Temp. | | Condenser Temp. (°F) | Probe Temp. (°F) | Meter Volume (ft ³) Initial Volume: | Notes | Schematic of Stack: | | |
| | | | Inlet (°F) | Outlet (°F) | | | | | | | |
| 5 | 5.0 | 1.0 | 43 | 43 | 37 | N/A | 735.619 | |  | | |
| 10 | 5.0 | 1.0 | 43 | 43 | 37 | | 738.863 | | | | |
| 15 | 5.0 | 1.0 | 43 | 43 | 37 | | 742.106 | | | | |
| 20 | 5.0 | 1.0 | 44 | 43 | 37 | | 745.355 | | | | |
| 25 | 5.0 | 1.0 | 44 | 44 | 37 | | 748.576 | | | | |
| 30 | 5.0 | 1.0 | 44 | 44 | 37 | | 751.800 | | | | |
| 35 | 5.0 | 1.0 | 44 | 44 | 38 | | 755.044 | | | | |
| 40 | 5.0 | 1.0 | 45 | 44 | 38 | | 758.288 | | | | |
| 45 | 5.0 | 1.0 | 45 | 44 | 38 | | 761.546 | | | | |
| 50 | 5.0 | 1.0 | 45 | 45 | 38 | | 764.792 | | | | |
| 55 | 5.0 | 1.0 | 45 | 45 | 38 | | 768.016 | | | | |
| 60 | 5.0 | 1.0 | 45 | 45 | 38 | | 771.260 | | | | |
| 65 | 5.0 | 1.0 | 43 | 44 | 41 | | 774.538 | | | | |
| 70 | 5.0 | 1.0 | 43 | 43 | 41 | | 777.850 | | | | |
| 75 | 5.0 | 1.0 | 43 | 43 | 43 | | 781.153 | | | | |
| 80 | 5.0 | 1.0 | 42 | 42 | 43 | | 784.451 | | | | |
| 85 | 5.0 | 1.0 | 42 | 42 | 43 | | 787.747 | | | | |
| 90 | 5.0 | 1.0 | 41 | 42 | 44 | | 791.050 | | | | |
| | | | | | | | 794.354 | | | | |
| | | | | | | | | Stack ID (inches): 102 | | | |
| | | | | | | | | Upstream Disturbance (inches): 7420 | | | |
| | | | | | | | | Downstream Disturbance (inches): 720 | | | |
| | | | | | | | | 200 gram Field Check of Scale (value): | | | |
| | | | | | | | | Moisture Determination | | | |
| | | | | | | | | Imp. # | Tare | Final | Gain |
| | | | | | | | | 1 | 487.1 | 453.9 | |
| | | | | | | | | 2 | 469.5 | 500.8 | |
| | | | | | | | | 3 | 311.9 | 477.6 | |
| | | | | | | | | 4 | 502.4 | 510.2 | |
| | | | | | | | | Total | 1770.9 | 1942.5 | 171.6 |
| | | | | | | | | Technician's Signature | | Project Leader's Signature | |
| min | max | avg | min | max | avg | diff | | | | | |
| 90 | 15.0 | 1.0 | 43.44 | 44 | N/A | 58.735 | | | | | |

FR03331

Run 3

Air Pollution Testing, Inc. : EPA Method 4 - Moisture Determination Datasheet

| | | | |
|-------------------------------------|---|--------------------------------------|-----------------------------------|
| APT Job #: FR03331 | Date: 3-4-14 | CO ₂ (%): CDAI | O ₂ (%): CDAI |
| Location: Grease Changer | Operator: JH/SK | Ambient Temperature (°F): | Barometric Press (mbar): 1013.867 |
| Run # 3 | Meter Box ID: MS-12 | Probe Length (ft): 3.5 | Moisture (grams): 247.0 |
| Meter Box Yr: 1-217 | Meter ΔH@: 1.53 | Static Pressure (°H ₂ O): | Start Time: 13:05 |
| Pre-Test Pump Leak Check: 0.0025 Hg | Post-Test Pump Leak Check: 0.00210 m Hg | Method: 4 | Stop Time: 15:05 |

| Sampling Time (minutes) | Vacuum (° Hg) | ΔH Orifice Setting (° H ₂ O) | T _m Meter Temp. | | Condenser Temp. (°F) | Probe Temp. (°F) | Meter Volume (ft ³) | Notes | Schematic of Stack:  |
|----------------------------|------------------|--|-------------------------------|----------------|----------------------------|------------------------|---------------------------------------|-------|--|
| | | | Inlet (°F) | Outlet (°F) | | | Initial Volume: | | |
| 5 | 5.0 | 1.0 | 44 | 44 | 46° | N/A | 791.415 | | |
| 10 | 5.0 | 1.0 | 44 | 44 | 46 | | 797.655 | | |
| 15 | 5.0 | 1.0 | 44 | 43 | 44 | | 804.138 | | |
| 20 | 5.0 | 1.0 | 44 | 43 | 43 | | 807.371 | | |
| 25 | 5.0 | 1.0 | 43 | 43 | 43 | | 810.616 | | |
| 30 | 5.0 | 1.0 | 43 | 43 | 44 | | 813.867 | | |
| 35 | 5.0 | 1.0 | 43 | 43 | 44 | | 817.200 | | |
| 40 | 5.0 | 1.0 | 43 | 43 | 45 | | 820.336 | | |
| 45 | 5.0 | 1.0 | 43 | 43 | 45 | | 823.458 | | |
| 50 | 5.0 | 1.0 | 43 | 42 | 45 | | 826.580 | | |
| 55 | 5.0 | 1.0 | 43 | 42 | 45 | | 829.710 | | |
| 60 | 5.0 | 1.0 | 43 | 42 | 45 | | 832.843 | | |
| 65 | 5.0 | 1.0 | 43 | 42 | 46 | | 835.965 | | |
| 70 | 5.0 | 1.0 | 42 | 42 | 47 | | 839.014 | | |
| 75 | 5.0 | 1.0 | 42 | 42 | 47 | | 842.196 | | |
| 80 | 5.0 | 1.0 | 42 | 42 | 47 | | 845.323 | | |
| 85 | 5.0 | 1.0 | 42 | 42 | 48 | | 848.549 | | |
| 90 | 5.0 | 1.0 | 42 | 42 | 48 | | 851.775 | | |
| 95 | 5.0 | 1.0 | 41 | 41 | 48 | | 854.990 | | |
| 100 | 5.0 | 1.0 | 41 | 41 | 48 | | 858.201 | | |
| 105 | 5.5 | 1.0 | 40 | 41 | 48 | | 861.434 | | |
| 110 | 5.5 | 1.0 | 40 | 41 | 47 | | 864.637 | | |
| 115 | 5.5 | 1.0 | 40 | 41 | 47 | | 867.834 | | |
| 120 | 5.5 | 1.0 | 40 | 40 | 47 | | 871.031 | | |
| total | maximum | average | average | | maximum | average | difference | | |
| 120 | 5.5 | 1.0 | 42.23 | | 48 | N/A | 7.0616 | | |

| Moisture Determination | | | |
|-------------------------|--------|-----------------------------|-------|
| Imp. # | Tare | Final | Gain |
| 1 | 453.9 | 506.3 | |
| 2 | 449.0 | 575.5 | |
| 3 | 313.3 | 361.0 | |
| 4 | 510.2 | 530.6 | |
| Total | 1726.4 | 1973.4 | 247.0 |
| Technician's Signature: | | Project Leader's Signature: | |

R 1-3

| Air Pollution Testing Inc. : EPA Method 2 - Pitot Traverse Datasheet | | | | | | | | | |
|--|--|--|--|-------------------------------------|-------------------------------------|--|--|--|--|
| Job # : | F80 3331 | Operator : | JCH / SW | Stack Diameter (Inches) : | 102" | | | | |
| Facility : | Eonetics Refinery | Site : | Coke Charger | Upstream Disturbance (Inches) : | 20' / 24' | | | | |
| Date : | 3-4-14 | Points : | 1 8.5 5 2 16.7 6 3 24.8 7 4 32.0 8 9 10 11 12 | Downstream Disturbance (Inches) : | 100' ± | | | | |
| Probe ID : | P-577 | Schematic of Sampling Location : | -150' (S) | | | | | | |
| Pitot Constant | .837 | | | | | | | | |
| Run # : 1 | O2% : LDA5 CO2% : LDA5 | Run # : 2 | O2% : LDA5 CO2% : LDA5 | Run # : 3 | O2% : LDA5 CO2% : LDA5 | | | | |
| H2O% : LDA5 measured / estimate | H2O% : LDA5 measured / estimate | H2O% : LDA5 measured / estimate | H2O% : LDA5 measured / estimate | H2O% : LDA5 measured / estimate | H2O% : LDA5 measured / estimate | | | | |
| Ps ("H2O) .1 Pb (mbar) : 0.1 x 2.87 | Ps ("H2O) .1 Pb (mbar) : 0.1 x 2.87 | Ps ("H2O) .1 Pb (mbar) : 0.1 x 2.87 | Ps ("H2O) .1 Pb (mbar) : 0.1 x 2.87 | Ps ("H2O) .1 Pb (mbar) : 0.1 x 2.87 | Ps ("H2O) .1 Pb (mbar) : 0.1 x 2.87 | | | | |
| Star Time : 9:52 Stop Time : 10:05 | Star Time : 10:23 Stop Time : 10:34 | Star Time : 11:00 Stop Time : 11:17 | | | | | | | |
| Post Test Pilot Leak Check Good? : e.e. 0.3 m h ₂ o | Post Test Pilot Leak Check Good? : e.e. 0.4 m h ₂ o | Post Test Pilot Leak Check Good? : e.e. 0.4 m h ₂ o | | | | | | | |
| Point # Delta P Ts Notes | Point # Delta P Ts Notes | Point # Delta P Ts Notes | | | | | | | |
| 1-1 .05 312 | 1-1 .05 312 | 1-1 .05 313 | | | | | | | |
| 2 .05 312 | 2 .05 312 | 2 .05 313 | | | | | | | |
| 3 .05 312 | 3 .05 313 | 3 .05 313 | | | | | | | |
| 4 .07 312 | 4 .09 313 | 4 .07 313 | | | | | | | |
| 2-8 .01 312 | 2-1 .11 313 | 2-1 .10 315 | | | | | | | |
| 2 .10 312 | 2 .09 313 | 2 .08 315 | | | | | | | |
| 3 .08 312 | 3 .02 314 | 3 .07 315 | | | | | | | |
| 4 .07 312 | 4 .02 314 | 4 .05 315 | | | | | | | |
| 3-1 .05 312 | 3-1 .05 314 | 3-1 .05 315 | | | | | | | |
| 2 .05 312 | 2 .05 314 | 2 .06 315 | | | | | | | |
| 3 .08 312 | 3 .07 314 | 3 .06 315 | | | | | | | |
| 4 .10 312 | 4 .12 314 | 4 .10 315 | | | | | | | |
| 4-1 .05 312 | 4-1 .05 314 | 4-1 .05 315 | | | | | | | |
| 2 .05 312 | 2 .05 315 | 2 .05 314 | | | | | | | |
| 3 .05 312 | 3 .05 315 | 3 .07 314 | | | | | | | |
| 4 .07 312 | 4 .06 315 | 4 .06 314 | | | | | | | |
| Averages : 10.254 312.7 | Averages : 10.254 312.7 | Averages : 10.254 312.7 | | | | | | | |
| Signature : [Signature] | Signature : [Signature] | Signature : [Signature] | | | | | | | |

Reviewers Signature :

R 4-G-

| Air Pollution Testing Inc. : EPA Method 2 - Pitot Traverse Datasheet | | | | | | | | | | | |
|--|------------------------------------|--------------|-------|--|------------------------------------|--------------|-------|--|------------------------------------|--------------|-------|
| Job #: | FR 3331 | | | Operator: | JCH / SW | | | Stack Diameter (Inches): | 10.2" | | |
| Facility: | Greiner Refinery | | | Site: | Crude Charger | | | Upstream Disturbance (Inches): | ~ 30' (340") | | |
| Date: | 3-4-14 | | | Points: | 13.3 | 5 | 9 | Downstream Disturbance (Inches): | ~ 150' (1800") | | |
| Probe ID: | P-577 | | | | 215.7 | 6 | 10 | Schematic of Sampling Location: | | | |
| Pitot Constant: | 837 | | | | 344.8 | 7 | 11 | | | | |
| | | | | | 438.0 | 8 | 12 | | | | |
| Run #: 4 | O2%: <u>LDAS</u> CO2%: <u>LDAS</u> | | | Run #: 5 | O2%: <u>LDAS</u> CO2%: <u>LDAS</u> | | | Run #: 6 | O2%: <u>LDAS</u> CO2%: <u>LDAS</u> | | |
| H2O%: <u>LDAS</u> | measured / estimate <u>AL</u> | | | H2O%: <u>LDAS</u> | measured / estimate <u>AL</u> | | | H2O%: <u>LDAS</u> | measured / estimate <u>AL</u> | | |
| Ps (H2O): <u>.1</u> | Pb (mbar): <u>1012.807</u> | | | Ps (H2O): <u>.1</u> | Pb (mbar): <u>1012.807</u> | | | Ps (H2O): <u>.1</u> | Pb (mbar): <u>1012.807</u> | | |
| Start Time: <u>11:38</u> | Stop Time: <u>11:48</u> | | | Start Time: <u>12:08</u> | Stop Time: <u>12:19</u> | | | Start Time: <u>12:57</u> | Stop Time: <u>12:59</u> | | |
| Post Test Pitot Leak Check Good?: <u>0.0224m/s</u> | | | | Post Test Pitot Leak Check Good?: <u>0.0224m/s</u> | | | | Post Test Pitot Leak Check Good?: <u>0.0224m/s</u> | | | |
| Point # | Delta P | Ts | Notes | Point # | Delta P | Ts | Notes | Point # | Delta P | Ts | Notes |
| 1-1 | .04 | 307 | | 1-1 | .05 | 308 | | 1-1 | .05 | 309 | |
| 2 | .04 | 307 | | 2 | .05 | 308 | | 2 | .06 | 308 | |
| 3 | .06 | 307 | | 3 | .05 | 309 | | 3 | .06 | 309 | |
| 4 | .05 | 307 | | 4 | .05 | 308 | | 4 | .07 | 309 | |
| 2-1 | .05 | 308 | | 2-1 | .05 | 308 | | 2-1 | .05 | 308 | |
| 2 | .05 | 308 | | 2 | .05 | 308 | | 2 | .05 | 308 | |
| 3 | .05 | 308 | | 3 | .05 | 308 | | 3 | .07 | 308 | |
| 4 | .04 | 308 | | 4 | .04 | 309 | | 4 | .05 | 309 | |
| 3-1 | .05 | 308 | | 3-1 | .08 | 309 | | 3-1 | .08 | 309 | |
| 2 | .07 | 308 | | 2 | .10 | 309 | | 2 | .09 | 309 | |
| 3 | .10 | 308 | | 3 | .13 | 309 | | 3 | .10 | 310 | |
| 4 | .07 | 308 | | 4 | .08 | 309 | | 4 | .07 | 310 | |
| 4-1 | .05 | 309 | | 4-1 | .05 | 309 | | 4-1 | .05 | 310 | |
| 2 | .09 | 309 | | 2 | .10 | 309 | | 2 | .07 | 311 | |
| 3 | .09 | 309 | | 3 | .10 | 310 | | 3 | .07 | 311 | |
| 4 | .11 | 309 | | 4 | .10 | 310 | | 4 | .07 | 311 | |
| Averages | <u>0.2419</u> | <u>307.9</u> | | Averages | <u>0.2613</u> | <u>308.7</u> | | Averages | <u>0.2592</u> | <u>309.3</u> | |
| Reviewer's Signature: | | | | | | | | | | | |

R 7-9

Air Pollution Testing Inc. : EPA Method 2 - Pitot Traverse Datasheet

| Job # | Facility | Date | Probe ID | Pitot Constant | Operator | Site | Points | Stack Diameter (inches) | Upstream Disturbance (inches) | Downstream Disturbance (inches) | Schematic of Sampling Location | | | | | | | | | | | | |
|----------------------|-------------------|-----------|-----------|---------------------|-------------------|------------------|--|-------------------------|-------------------------------|---------------------------------|--------------------------------|---------------|-------------------|------------------|---|----------|----------|-----------|-----------|---------------|-------------------|------------------|---|
| FR03331 | Frontier Refinery | 3-4-14 | P-533 | .437 | JCH / SW | Crocker-Charger | 18.5 5 9 216.7 8 10 324.8 7 11 425.0 8 12 | 102 | 20' 240" | 150' 1400" | | | | | | | | | | | | | |
| Run #: 7 | O2%: LDA | CO2%: LDA | H2O%: LDA | Ps ("H2O): .1 | Start Time: 13:10 | Stop Time: 13:22 | Post Test Pilot Leak Check Good?: 0.00214 | Run #: 8 | O2%: LDA | CO2%: LDA | H2O%: LDA | Ps ("H2O): .1 | Start Time: 13:38 | Stop Time: 13:49 | Post Test Pilot Leak Check Good?: 0.00243 | Run #: 9 | O2%: LDA | CO2%: LDA | H2O%: LDA | Ps ("H2O): .1 | Start Time: 14:08 | Stop Time: 14:19 | Post Test Pilot Leak Check Good?: 0.00214 |
| Point # | Delta P | Ts | Notes | Point # | Delta P | Ts | Notes | Point # | Delta P | Ts | Notes | | | | | | | | | | | | |
| 1-1 | .05 | 330 | | 1-1 | .05 | 328 | | 1-1 | .03 | 325 | | | | | | | | | | | | | |
| 2 | .07 | 330 | | 2 | .06 | 328 | | 2 | .05 | 325 | | | | | | | | | | | | | |
| 3 | .07 | 330 | | 3 | .06 | 328 | | 3 | .04 | 325 | | | | | | | | | | | | | |
| 4 | .06 | 330 | | 4 | .07 | 328 | | 4 | .05 | 325 | | | | | | | | | | | | | |
| 2-1 | .05 | 330 | | 2-1 | .05 | 328 | | 2-1 | .05 | 325 | | | | | | | | | | | | | |
| 2 | .05 | 330 | | 2 | .05 | 328 | | 2 | .05 | 325 | | | | | | | | | | | | | |
| 3 | .04 | 330 | | 3 | .09 | 328 | | 3 | .03 | 325 | | | | | | | | | | | | | |
| 4 | .05 | 330 | | 4 | .1 | 328 | | 4 | .1 | 326 | | | | | | | | | | | | | |
| 3-1 | .06 | 330 | | 3-1 | .05 | 328 | | 3-1 | .05 | 326 | | | | | | | | | | | | | |
| 2 | .08 | 330 | | 2 | .03 | 327 | | 2 | .06 | 326 | | | | | | | | | | | | | |
| 3 | .08 | 330 | | 3 | .05 | 327 | | 3 | .06 | 326 | | | | | | | | | | | | | |
| 4 | .07 | 330 | | 4 | .05 | 327 | | 4 | .08 | 326 | | | | | | | | | | | | | |
| 4-1 | .05 | 330 | | 4-1 | .04 | 328 | | 4-1 | .05 | 326 | | | | | | | | | | | | | |
| 2 | .1 | 330 | | 2 | .06 | 328 | | 2 | .05 | 326 | | | | | | | | | | | | | |
| 3 | .08 | 330 | | 3 | .03 | 328 | | 3 | .05 | 326 | | | | | | | | | | | | | |
| 4 | .05 | 330 | | 4 | .02 | 328 | | 4 | .07 | 326 | | | | | | | | | | | | | |
| Averages: .2494 330 | | | | Averages: .2469 328 | | | | Averages: .2363 325.6 | | | | | | | | | | | | | | | |
| Reviewers Signature: | | | | | | | | | | | | | | | | | | | | | | | |

| Air Pollution Testing Inc. : EPA Method 2 - Pitot Traverse Worksheet | | | | | | | | | | | |
|---|--------------------------|------------------------------------|--|--|--------------------------|-----------|--------------|------------------|----------------|-----------|--------------|
| Job # : | FRO 3331 | Operator : | JCH / SW | Stack Diameter (Inches) : | 102 | | | | | | |
| Facility : | Election Refinery | Site : | Coke Charger | Upstream Disturbance (Inches) : | -20' (240") | | | | | | |
| Date : | 3-4-14 | Points : | 1 8.3 5 9 2 15.7 6 10 3 24.8 7 11 4 33.0 8 12 | Downstream Disturbance (Inches) : | -150' (1800") | | | | | | |
| Probe ID : | P-577 | | | Schematic of Sampling Location : | | | | | | | |
| Pitot Constant : | .837 | | | | | | | | | | |
| Run #: 10 | | Run #: 11 | | Run #: 12 | | | | | | | |
| O2%: | LDA5 CO2%: LDA5 | O2%: | LDA5 CO2%: LDA5 | O2%: | LDA5 CO2%: LDA5 | | | | | | |
| H2O%: | LDA5 measured / estimate | H2O%: | LDA5 measured / estimate | H2O%: | LDA5 measured / estimate | | | | | | |
| Ps ("H2O) | .1 Pb (mbar): 102 L spot | Ps ("H2O): | Pb (mbar): | Ps ("H2O): | Pb (mbar): | | | | | | |
| Start Time: | 14:45 Stop Time: 14:56 | Start Time: | Stop Time: | Start Time: | Stop Time: | | | | | | |
| Post Test Pitot Leak Check Good? : | | Post Test Pitot Leak Check Good? : | | Post Test Pitot Leak Check Good? : | | | | | | | |
| Point # | Delta P | Ts | Notes | Point # | Delta P | Ts | Notes | Point # | Delta P | Ts | Notes |
| 1-1 | .04 | 322 | | | | | | | | | |
| 2 | .05 | 321 | | | | | | | | | |
| 3 | .05 | 322 | | | | | | | | | |
| 4 | .05 | 322 | | | | | | | | | |
| 2-1 | .05 | 324 | | | | | | | | | |
| 2 | .06 | 324 | | | | | | | | | |
| 3 | .08 | 324 | | | | | | | | | |
| 4 | .11 | 323 | | | | | | | | | |
| 3-1 | .05 | 323 | | | | | | | | | |
| 2 | .07 | 323 | | | | | | | | | |
| 3 | .07 | 324 | | | | | | | | | |
| 4 | .09 | 329 | | | | | | | | | |
| 4-1 | .04 | 325 | | | | | | | | | |
| 2 | .04 | 325 | | | | | | | | | |
| 3 | .06 | 325 | | | | | | | | | |
| 4 | .10 | 325 | | | | | | | | | |
| 1-1 | | | | | | | | | | | |
| 2 | | | | | | | | | | | |
| 3 | | | | | | | | | | | |
| 4 | | | | | | | | | | | |
| 2-1 | | | | | | | | | | | |
| 2 | | | | | | | | | | | |
| 3 | | | | | | | | | | | |
| 4 | | | | | | | | | | | |
| 3-1 | | | | | | | | | | | |
| 2 | | | | | | | | | | | |
| 3 | | | | | | | | | | | |
| 4 | | | | | | | | | | | |
| 4-1 | | | | | | | | | | | |
| 2 | | | | | | | | | | | |
| 3 | | | | | | | | | | | |
| 4 | | | | | | | | | | | |
| 1-1 | | | | | | | | | | | |
| 2 | | | | | | | | | | | |
| 3 | | | | | | | | | | | |
| 4 | | | | | | | | | | | |
| 2-1 | | | | | | | | | | | |
| 2 | | | | | | | | | | | |
| 3 | | | | | | | | | | | |
| 4 | | | | | | | | | | | |
| 3-1 | | | | | | | | | | | |
| 2 | | | | | | | | | | | |
| 3 | | | | | | | | | | | |
| 4 | | | | | | | | | | | |
| 4-1 | | | | | | | | | | | |
| 2 | | | | | | | | | | | |
| 3 | | | | | | | | | | | |
| 4 | | | | | | | | | | | |
| Averages: | | (.2480) | (323.5) | Averages: | | | | Averages: | | | |
| Reviewers Signature: | | | | | | | | | | | |

Converter Efficiency Test

40 CFR Part. 60, Appendix A, Method 7E, Section 16.2

16.2 - Alternative NO₂ to NO Conversion Efficiency Procedures.

16.2.2 - Add gas from the mid-level NO in N₂ calibration gas cylinder to a clean, evacuated, leak-tight Tedlar bag. Dilute this gas approximately 1:1 with 20.9% O₂, purified air. Immediately attach the bag outlet to the calibration valve assembly and begin operation of the sampling system. Operate the sampling system, recording the NO_x response, for at least 30 minutes. If the NO₂ to NO conversion is 100%, the instrument response will be stable at the highest peak value observed. If the response at the end of 30 minutes decreases more than 2.0% of the highest peak value, the system is not acceptable and corrections must be made before repeating the check.

Date of Test: 3/4/14
Analyzer Type: NO_x
Analyzer S/N: 426-1
Span Value: 38.9
Mid-Level Gas Concentration: 18.2

| | Start of Test: | | After 30 Minutes: |
|-------------------------------------|------------------|---------------------------------|-------------------|
| Time: | <u>1510 1511</u> | Time: | <u>1541</u> |
| NO _x High Peak Response: | <u>9.41</u> | NO _x Final Response: | <u>9.40</u> |
| NO Response: | <u>9.21</u> | NO Response: | <u>7.01</u> |
| | | NO _x % Decrease: | <u>0.1 %</u> |

40 CFR Part. 60, Appendix A, Method 7E, Section 12.9, Equation 7E-9

$$\% \text{ Decrease} = 100 \times \frac{\text{NO}_x \text{ Peak} - \text{NO}_x \text{ Final}}{\text{NO}_x \text{ Peak}}$$

Appendix 3

CEMS Data

CeDAR 1-Minute Data
Frontier Refining LLC
Data for 3/4/2014 9:46 AM thru 3/4/2014 10:09 AM

| Timestamp | (Crude Charge Heater) NOx ppm 1-Min | (Crude Charge Heater) NOx ppm @15% O2 1-Min | (Crude Charge Heater) NOx lb/mmBtu 1-Min | (Crude Charge Heater) NOx lb/hr 1-Min Avg | (Crude Charge Heater) O2% 1-Min | (Crude Charge Heater) Stack Flow Rate scf/hr 1-Min |
|-----------------------------|-------------------------------------|---|--|---|---------------------------------|--|
| 3/4 9:46 | 17.65 | 6.19 | 0.0228 | 2.21 | 4.09 | 1048553 |
| 3/4 9:47 | 17.63 | 6.17 | 0.0227 | 2.21 | 4.04 | 1048553 |
| 3/4 9:48 | 17.48 | 6.13 | 0.0225 | 2.19 | 4.08 | 1048553 |
| 3/4 9:49 | 17.38 | 6.09 | 0.0224 | 2.18 | 4.05 | 1048553 |
| 3/4 9:50 | 17.38 | 6.08 | 0.0224 | 2.17 | 4.06 | 1048553 |
| 3/4 9:51 | 17.33 | 6.03 | 0.0222 | 2.17 | 3.95 | 1048553 |
| 3/4 9:52 | 17.30 | 6.03 | 0.0221 | 2.17 | 3.96 | 1048553 |
| 3/4 9:53 | 17.41 | 6.11 | 0.0225 | 2.18 | 4.09 | 1048553 |
| 3/4 9:54 | 17.57 | 6.17 | 0.0227 | 2.20 | 4.09 | 1048553 |
| 3/4 9:55 | 17.57 | 6.17 | 0.0227 | 2.20 | 4.09 | 1048553 |
| 3/4 9:56 | 17.46 | 6.11 | 0.0224 | 2.19 | 4.03 | 1048553 |
| 3/4 9:57 | 17.42 | 6.10 | 0.0224 | 2.18 | 4.05 | 1048553 |
| 3/4 9:58 | 17.42 | 6.09 | 0.0224 | 2.18 | 4.03 | 1047876 |
| 3/4 9:59 | 17.44 | 6.10 | 0.0224 | 2.18 | 4.02 | 1047876 |
| 3/4 10:00 | 17.42 | 6.10 | 0.0224 | 2.18 | 4.06 | 1047876 |
| 3/4 10:01 | 17.45 | 6.15 | 0.0226 | 2.19 | 4.15 | 1048553 |
| 3/4 10:02 | 17.47 | 6.14 | 0.0226 | 2.19 | 4.10 | 1048553 |
| 3/4 10:03 | 17.45 | 6.10 | 0.0224 | 2.19 | 4.02 | 1048553 |
| 3/4 10:04 | 17.44 | 6.09 | 0.0224 | 2.18 | 4.01 | 1047876 |
| 3/4 10:05 | 17.45 | 6.10 | 0.0224 | 2.18 | 4.01 | 1047876 |
| 3/4 10:06 | 17.44 | 6.11 | 0.0225 | 2.18 | 4.07 | 1047876 |
| 3/4 10:07 | 17.42 | 6.11 | 0.0225 | 2.18 | 4.08 | 1048553 |
| 3/4 10:08 | 17.41 | 6.10 | 0.0224 | 2.18 | 4.07 | 1048553 |
| 3/4 10:09 | 17.44 | 6.12 | 0.0225 | 2.18 | 4.08 | 1047876 |
| Average (all) | 17.45 | 6.11 | 0.0225 | 2.19 | 4.05 | 1048356 |
| Total (all) | -- | -- | -- | -- | -- | -- |
| Minimum (all) | 17.30 | 6.03 | 0.0221 | 2.17 | 3.95 | 1047876 |
| Maximum (all) | 17.65 | 6.19 | 0.0228 | 2.21 | 4.15 | 1048553 |
| Average (valid values only) | 17.45 | 6.11 | 0.0225 | 2.19 | 4.05 | 1048356 |
| Total (valid values only) | -- | -- | -- | -- | -- | -- |
| Count (valid values only) | 24 | 24 | 24 | 24 | 24 | 24 |

Comment: Crude Charge Heater RATA - Run #1 Rev 1

CeDAR 1-Minute Data

Frontier Refining LLC

Data for 3/4/2014 10:20 AM thru 3/4/2014 10:40 AM

| Timestamp | (Crude Charge Heater) NOx ppm 1-Min | (Crude Charge Heater) NOx ppm @15% O2 1-Min | (Crude Charge Heater) NOx lb/mmBtu 1-Min | (Crude Charge Heater) NOx lb/hr 1-Min Avg | (Crude Charge Heater) O2% 1-Min | (Crude Charge Heater) Stack Flow Rate scf/hr 1-Min |
|-----------------------------|-------------------------------------|---|--|---|---------------------------------|--|
| 3/4 10:20 | 17.25 | 6.08 | 0.0223 | 2.16 | 4.16 | 1049232 |
| 3/4 10:21 | 17.32 | 6.11 | 0.0225 | 2.17 | 4.18 | 1049232 |
| 3/4 10:22 | 17.34 | 6.08 | 0.0223 | 2.17 | 4.07 | 1049232 |
| 3/4 10:23 | 17.24 | 6.04 | 0.0222 | 2.16 | 4.06 | 1049232 |
| 3/4 10:24 | 17.20 | 6.03 | 0.0222 | 2.15 | 4.08 | 1049232 |
| 3/4 10:25 | 17.14 | 6.01 | 0.0221 | 2.15 | 4.06 | 1049912 |
| 3/4 10:26 | 17.08 | 5.98 | 0.0220 | 2.14 | 4.06 | 1049912 |
| 3/4 10:27 | 17.10 | 5.96 | 0.0219 | 2.14 | 3.98 | 1049912 |
| 3/4 10:28 | 17.16 | 6.01 | 0.0221 | 2.15 | 4.05 | 1049232 |
| 3/4 10:29 | 17.25 | 6.05 | 0.0223 | 2.16 | 4.09 | 1049912 |
| 3/4 10:30 | 17.26 | 6.04 | 0.0222 | 2.16 | 4.05 | 1049912 |
| 3/4 10:31 | 17.31 | 6.09 | 0.0224 | 2.17 | 4.14 | 1049232 |
| 3/4 10:32 | 17.30 | 6.07 | 0.0223 | 2.17 | 4.08 | 1049232 |
| 3/4 10:33 | 17.25 | 6.03 | 0.0222 | 2.16 | 4.02 | 1049232 |
| 3/4 10:34 | 17.12 | 5.97 | 0.0219 | 2.14 | 3.97 | 1048553 |
| 3/4 10:35 | 17.01 | 5.96 | 0.0219 | 2.13 | 4.07 | 1048553 |
| 3/4 10:36 | 17.12 | 6.02 | 0.0221 | 2.14 | 4.11 | 1049232 |
| 3/4 10:37 | 17.26 | 6.03 | 0.0222 | 2.16 | 4.00 | 1049232 |
| 3/4 10:38 | 17.32 | 6.06 | 0.0223 | 2.17 | 4.04 | 1048553 |
| 3/4 10:39 | 17.41 | 6.12 | 0.0225 | 2.18 | 4.11 | 1048553 |
| 3/4 10:40 | 17.45 | 6.11 | 0.0224 | 2.19 | 4.04 | 1048553 |
| Average (all) | 17.23 | 6.04 | 0.0222 | 2.16 | 4.07 | 1049232 |
| Total (all) | -- | -- | -- | -- | -- | -- |
| Minimum (all) | 17.01 | 5.96 | 0.0219 | 2.13 | 3.97 | 1048553 |
| Maximum (all) | 17.45 | 6.12 | 0.0225 | 2.19 | 4.18 | 1049912 |
| Average (valid values only) | 17.23 | 6.04 | 0.0222 | 2.16 | 4.07 | 1049232 |
| Total (valid values only) | -- | -- | -- | -- | -- | -- |
| Count (valid values only) | 21 | 21 | 21 | 21 | 21 | 21 |

Comment: Crude Charge Heater RATA - Run #2

CeDAR 1-Minute Data
Frontier Refining LLC
Data for 3/4/2014 10:56 AM thru 3/4/2014 11:18 AM

| Timestamp | (Crude Charge Heater) NOx ppm 1-Min | (Crude Charge Heater) NOx ppm @15% O2 1-Min | (Crude Charge Heater) NOx lb/mmBtu 1-Min | (Crude Charge Heater) NOx lb/hr 1-Min Avg | (Crude Charge Heater) O2% 1-Min | (Crude Charge Heater) Stack Flow Rate scf/hr 1-Min |
|-----------------------------|-------------------------------------|---|--|---|---------------------------------|--|
| 3/4 10:56 | 17.67 | 6.20 | 0.0228 | 2.21 | 4.09 | 1047876 |
| 3/4 10:57 | 17.57 | 6.16 | 0.0226 | 2.20 | 4.06 | 1047876 |
| 3/4 10:58 | 17.51 | 6.11 | 0.0225 | 2.19 | 3.99 | 1047876 |
| 3/4 10:59 | 17.47 | 6.11 | 0.0225 | 2.19 | 4.04 | 1048553 |
| 3/4 11:00 | 17.47 | 6.12 | 0.0225 | 2.19 | 4.05 | 1048553 |
| 3/4 11:01 | 17.47 | 6.10 | 0.0224 | 2.19 | 3.99 | 1047876 |
| 3/4 11:02 | 17.42 | 6.07 | 0.0223 | 2.18 | 3.98 | 1047876 |
| 3/4 11:03 | 17.42 | 6.10 | 0.0224 | 2.18 | 4.05 | 1047876 |
| 3/4 11:04 | 17.44 | 6.11 | 0.0224 | 2.18 | 4.05 | 1047876 |
| 3/4 11:05 | 17.53 | 6.13 | 0.0225 | 2.20 | 4.03 | 1048553 |
| 3/4 11:06 | 17.56 | 6.10 | 0.0224 | 2.20 | 3.91 | 1048553 |
| 3/4 11:07 | 17.56 | 6.12 | 0.0225 | 2.20 | 3.97 | 1047876 |
| 3/4 11:08 | 17.53 | 6.15 | 0.0226 | 2.19 | 4.07 | 1047876 |
| 3/4 11:09 | 17.51 | 6.13 | 0.0226 | 2.19 | 4.06 | 1047876 |
| 3/4 11:10 | 17.38 | 6.05 | 0.0222 | 2.18 | 3.95 | 1048553 |
| 3/4 11:11 | 17.31 | 6.03 | 0.0222 | 2.17 | 3.97 | 1048553 |
| 3/4 11:12 | 17.43 <25> | 6.07 <25> | 0.0223 <25> | 0.00 <25> | 3.95 <25> | 0 <25> |
| 3/4 11:13 | 0.00 <25> | 0.00 <25> | 0.0000 <25> | 0.00 <25> | 18.88 <25> | 0 <25> |
| 3/4 11:14 | 16.00 | 5.69 | 0.0209 | 2.00 <25> | 4.30 | 1047876 <25> |
| 3/4 11:15 | 17.48 | 6.12 | 0.0225 | 2.19 | 4.06 | 1047876 |
| 3/4 11:16 | 17.50 | 6.16 | 0.0226 | 2.19 | 4.13 | 1047876 |
| 3/4 11:17 | 17.54 | 6.14 | 0.0226 | 2.19 | 4.05 | 1047876 |
| 3/4 11:18 | 17.52 | 6.15 | 0.0226 | 2.19 | 4.08 | 1047876 |
| Average (all) | 16.66 | 5.83 | 0.0214 | 1.99 | 4.68 | 956933 |
| Total (all) | -- | -- | -- | -- | -- | -- |
| Minimum (all) | 0.00 | 0.00 | 0.0000 | 0.00 | 3.91 | 0 |
| Maximum (all) | 17.67 | 6.20 | 0.0228 | 2.21 | 18.88 | 1048553 |
| Average (valid values only) | 17.42 | 6.10 | 0.0224 | 2.19 | 4.04 | 1048079 |
| Total (valid values only) | -- | -- | -- | -- | -- | -- |
| Count (valid values only) | 21 | 21 | 21 | 20 | 21 | 20 |

<25> = Backflush

Comment: Crude Charge Heater RATA - Run #3 Rev 1

CeDAR 1-Minute Data

Frontier Refining LLC

Data for 3/4/2014 11:31 AM thru 3/4/2014 11:53 AM

| Timestamp | (Crude Charge Heater) NOx ppm 1-Min | (Crude Charge Heater) NOx ppm @15% O2 1-Min | (Crude Charge Heater) NOx lb/mmBtu 1-Min | (Crude Charge Heater) NOx lb/hr 1-Min Avg | (Crude Charge Heater) O2% 1-Min | (Crude Charge Heater) Stack Flow Rate scf/hr 1-Min |
|-----------------------------|-------------------------------------|---|--|---|---------------------------------|--|
| 3/4 11:31 | 17.47 | 6.14 | 0.0226 | 2.19 | 4.10 | 1047876 |
| 3/4 11:32 | 17.40 | 6.11 | 0.0226 | 2.18 | 4.11 | 1047876 |
| 3/4 11:33 | 17.29 | 6.06 | 0.0222 | 2.17 | 4.04 | 1048553 |
| 3/4 11:34 | 17.22 | 6.01 | 0.0221 | 2.16 | 4.00 | 1048553 |
| 3/4 11:35 | 17.32 | 6.07 | 0.0223 | 2.17 | 4.06 | 1048553 |
| 3/4 11:36 | 17.42 | 6.08 | 0.0224 | 2.18 | 4.00 | 1047876 |
| 3/4 11:37 | 17.32 | 6.05 | 0.0222 | 2.17 | 4.01 | 1047876 |
| 3/4 11:38 | 17.21 | 6.03 | 0.0222 | 2.15 | 4.06 | 1047876 |
| 3/4 11:39 | 17.25 | 6.08 | 0.0223 | 2.16 | 4.16 | 1047876 |
| 3/4 11:40 | 17.43 | 6.13 | 0.0225 | 2.18 | 4.13 | 1047876 |
| 3/4 11:41 | 17.43 | 6.08 | 0.0224 | 2.18 | 3.99 | 1047876 |
| 3/4 11:42 | 17.32 | 6.03 | 0.0221 | 2.17 | 3.94 | 1047876 |
| 3/4 11:43 | 17.25 | 6.03 | 0.0222 | 2.16 | 4.02 | 1047876 |
| 3/4 11:44 | 17.26 | 6.03 | 0.0222 | 2.16 | 4.00 | 1047876 |
| 3/4 11:45 | 17.26 | 6.03 | 0.0222 | 2.16 | 4.00 | 1047876 |
| 3/4 11:46 | 17.18 | 5.96 | 0.0219 | 2.15 | 3.89 | 1047876 |
| 3/4 11:47 | 17.08 | 5.93 | 0.0218 | 2.13 | 3.92 | 1047199 |
| 3/4 11:48 | 16.98 | 5.89 | 0.0216 | 2.12 | 3.89 | 1047199 |
| 3/4 11:49 | 16.97 | 5.92 | 0.0218 | 2.12 | 4.00 | 1047199 |
| 3/4 11:50 | 17.14 | 5.99 | 0.0220 | 2.14 | 4.03 | 1047199 |
| 3/4 11:51 | 17.23 | 6.01 | 0.0221 | 2.15 | 3.99 | 1048524 |
| 3/4 11:52 | 17.18 | 6.05 | 0.0222 | 2.15 | 4.14 | 1048524 |
| 3/4 11:53 | 17.21 | 6.06 | 0.0223 | 2.15 | 4.14 | 1045178 |
| Average (all) | 17.25 | 6.03 | 0.0222 | 2.16 | 4.03 | 1047612 |
| Total (all) | - | - | - | - | - | - |
| Minimum (all) | 16.97 | 5.89 | 0.0216 | 2.12 | 3.89 | 1045178 |
| Maximum (all) | 17.47 | 6.14 | 0.0226 | 2.19 | 4.16 | 1048553 |
| Average (valid values only) | 17.25 | 6.03 | 0.0222 | 2.16 | 4.03 | 1047612 |
| Total (valid values only) | - | - | - | - | - | - |
| Count (valid values only) | 23 | 23 | 23 | 23 | 23 | 23 |

Comment: Crude Charge Heater RATA - Run #4 Rev 1

CeDAR 1-Minute Data
Frontier Refining LLC
Data for 3/4/2014 12:03 PM thru 3/4/2014 12:23 PM

| Timestamp | (Crude Charge Heater) NOx ppm 1-Min | (Crude Charge Heater) NOx ppm @15% O2 1-Min | (Crude Charge Heater) NOx lb/mmBtu 1-Min | (Crude Charge Heater) NOx lb/hr 1-Min Avg | (Crude Charge Heater) O2% 1-Min | (Crude Charge Heater) Stack Flow Rate scf/hr 1-Min |
|-----------------------------|-------------------------------------|---|--|---|---------------------------------|--|
| 3/4 12:03 | 17.33 | 6.09 | 0.0224 | 2.16 | 4.12 | 1041836 |
| 3/4 12:04 | 17.40 | 6.10 | 0.0224 | 2.16 | 4.06 | 1041171 |
| 3/4 12:05 | 17.37 | 6.08 | 0.0223 | 2.16 | 4.04 | 1041171 |
| 3/4 12:06 | 17.30 | 6.05 | 0.0222 | 2.15 | 4.03 | 1041171 |
| 3/4 12:07 | 17.24 | 6.04 | 0.0222 | 2.62 | 4.06 | 1274357 |
| 3/4 12:08 | 17.23 | 6.04 | 0.0222 | 2.14 | 4.07 | 1040508 |
| 3/4 12:09 | 17.31 | 6.07 | 0.0223 | 2.15 | 4.07 | 1040508 |
| 3/4 12:10 | 17.42 | 6.11 | 0.0224 | 2.16 | 4.07 | 1039846 |
| 3/4 12:11 | 17.34 | 6.06 | 0.0223 | 2.15 | 4.02 | 1039846 |
| 3/4 12:12 | 17.24 | 6.02 | 0.0221 | 2.14 | 4.01 | 1039185 |
| 3/4 12:13 | 17.11 | 5.99 | 0.0220 | 2.60 | 4.06 | 1272736 |
| 3/4 12:14 | 17.12 | 6.00 | 0.0220 | 2.60 | 4.06 | 1272736 |
| 3/4 12:15 | 17.15 | 6.01 | 0.0221 | 2.61 | 4.05 | 1272736 |
| 3/4 12:16 | 17.24 | 6.01 | 0.0221 | 2.14 | 3.98 | 1038525 |
| 3/4 12:17 | 17.26 | 6.03 | 0.0222 | 2.62 | 4.01 | 1271122 |
| 3/4 12:18 | 17.32 | 6.08 | 0.0223 | 2.15 | 4.09 | 1037867 |
| 3/4 12:19 | 17.36 | 6.07 | 0.0223 | 2.63 | 4.03 | 1271122 |
| 3/4 12:20 | 17.31 | 6.06 | 0.0223 | 2.63 | 4.04 | 1271122 |
| 3/4 12:21 | 17.31 | 6.05 | 0.0222 | 2.63 | 4.02 | 1271122 |
| 3/4 12:22 | 17.42 | 6.09 | 0.0224 | 2.64 | 4.01 | 1270317 |
| 3/4 12:23 | 17.43 | 6.07 | 0.0223 | 2.64 | 3.96 | 1270317 |
| Average (all) | 17.30 | 6.05 | 0.0222 | 2.38 | 4.04 | 1150444 |
| Total (all) | -- | -- | -- | -- | -- | -- |
| Minimum (all) | 17.11 | 5.99 | 0.0220 | 2.14 | 3.96 | 1037867 |
| Maximum (all) | 17.43 | 6.11 | 0.0224 | 2.64 | 4.12 | 1274357 |
| Average (valid values only) | 17.30 | 6.05 | 0.0222 | 2.38 | 4.04 | 1150444 |
| Total (valid values only) | -- | -- | -- | -- | -- | -- |
| Count (valid values only) | 21 | 21 | 21 | 21 | 21 | 21 |

Comment: Crude Charge Heater RATA - Run #5

CeDAR 1-Minute Data
Frontier Refining LLC
Data for 3/4/2014 12:33 PM thru 3/4/2014 12:53 PM

| Timestamp | (Crude Charge Heater) NOx ppm 1-Min | (Crude Charge Heater) NOx ppm @15% O2 1-Min | (Crude Charge Heater) NOx lb/mmBtu 1-Min | (Crude Charge Heater) NOx lb/hr 1-Min Avg | (Crude Charge Heater) O2% 1-Min | (Crude Charge Heater) Stack Flow Rate scf/hr 1-Min |
|-----------------------------|-------------------------------------|---|--|---|---------------------------------|--|
| 3/4 12:33 | 17.28 | 6.04 | 0.0222 | 2.62 | 4.02 | 1268712 |
| 3/4 12:34 | 17.38 | 6.08 | 0.0224 | 2.63 | 4.04 | 1268712 |
| 3/4 12:35 | 17.44 | 6.11 | 0.0224 | 2.64 | 4.05 | 1267912 |
| 3/4 12:36 | 17.42 | 6.08 | 0.0224 | 2.64 | 4.03 | 1267912 |
| 3/4 12:37 | 17.36 | 6.05 | 0.0223 | 2.63 | 3.98 | 1267912 |
| 3/4 12:38 | 17.38 | 6.07 | 0.0223 | 2.63 | 4.01 | 1267912 |
| 3/4 12:39 | 17.39 | 6.07 | 0.0223 | 2.63 | 4.00 | 1267912 |
| 3/4 12:40 | 17.38 | 6.09 | 0.0224 | 2.63 | 4.05 | 1267114 |
| 3/4 12:41 | 17.37 | 6.09 | 0.0224 | 2.63 | 4.06 | 1267114 |
| 3/4 12:42 | 17.34 | 6.04 | 0.0222 | 2.62 | 3.98 | 1267114 |
| 3/4 12:43 | 17.27 | 6.04 | 0.0222 | 2.61 | 4.02 | 1267912 |
| 3/4 12:44 | 17.30 | 6.07 | 0.0223 | 2.62 | 4.06 | 1267912 |
| 3/4 12:45 | 17.44 | 6.11 | 0.0225 | 2.64 | 4.06 | 1267114 |
| 3/4 12:46 | 17.53 | 6.12 | 0.0225 | 2.65 | 3.99 | 1267114 |
| 3/4 12:47 | 17.49 | 6.14 | 0.0226 | 2.65 | 4.09 | 1267114 |
| 3/4 12:48 | 17.53 | 6.18 | 0.0227 | 2.17 | 4.17 | 1034594 |
| 3/4 12:49 | 17.53 | 6.14 | 0.0226 | 2.17 | 4.06 | 1035246 |
| 3/4 12:50 | 17.47 | 6.12 | 0.0225 | 2.64 | 4.07 | 1267912 |
| 3/4 12:51 | 17.49 | 6.16 | 0.0226 | 2.65 | 4.14 | 1267912 |
| 3/4 12:52 | 17.55 | 6.17 | 0.0227 | 2.17 | 4.13 | 1035246 |
| 3/4 12:53 | 17.45 | 6.12 | 0.0225 | 2.64 | 4.07 | 1268712 |
| Average (all) | 17.42 | 6.10 | 0.0224 | 2.57 | 4.05 | 1234529 |
| Total (all) | -- | -- | -- | -- | -- | -- |
| Minimum (all) | 17.27 | 6.04 | 0.0222 | 2.17 | 3.96 | 1034594 |
| Maximum (all) | 17.55 | 6.18 | 0.0227 | 2.65 | 4.17 | 1268712 |
| Average (valid values only) | 17.42 | 6.10 | 0.0224 | 2.57 | 4.05 | 1234529 |
| Total (valid values only) | -- | -- | -- | -- | -- | -- |
| Count (valid values only) | 21 | 21 | 21 | 21 | 21 | 21 |

Comment: Crude Charge Heater RATA - Run #6

CeDAR 1-Minute Data

Frontier Refining LLC

Data for 3/4/2014 1:02 PM thru 3/4/2014 1:25 PM

| Timestamp | (Crude Charge Heater) NOx ppm 1-Min | (Crude Charge Heater) NOx ppm @15% O2 1-Min | (Crude Charge Heater) NOx lb/mmBtu 1-Min | (Crude Charge Heater) NOx lb/hr 1-Min Avg | (Crude Charge Heater) O2% 1-Min | (Crude Charge Heater) Stack Flow Rate scf/hr 1-Min |
|-----------------------------|-------------------------------------|---|--|---|---------------------------------|--|
| 3/4 13:02 | 17.15 | 6.00 | 0.0221 | 2.60 | 4.04 | 1268712 |
| 3/4 13:03 | 17.10 | 5.94 | 0.0218 | 2.59 | 3.91 | 1268712 |
| 3/4 13:04 | 16.99 | 5.94 | 0.0218 | 2.57 | 4.02 | 1268712 |
| 3/4 13:05 | 17.03 | 5.97 | 0.0219 | 2.58 | 4.08 | 1268712 |
| 3/4 13:06 | 17.18 | 6.03 | 0.0222 | 2.12 | 4.08 | 1035246 |
| 3/4 13:07 | 17.25 | 6.01 | 0.0221 | 2.61 | 3.96 | 1267114 |
| 3/4 13:08 | 17.25 | 6.02 | 0.0221 | 2.61 | 4.00 | 1267114 |
| 3/4 13:09 | 17.31 | 6.08 | 0.0224 | 2.62 | 4.11 | 1267912 |
| 3/4 13:10 | 17.36 | 6.08 | 0.0224 | 2.63 | 4.06 | 1267912 |
| 3/4 13:11 | 17.32 | 6.04 | 0.0222 | 2.62 | 3.99 | 1267912 |
| 3/4 13:12 | 17.24 | 6.04 | 0.0222 | 2.61 | 4.06 | 1267114 |
| 3/4 13:13 | 17.21 | 6.02 | 0.0221 | 2.13 | 4.02 | 1035246 |
| 3/4 13:14 | 17.21 | 6.03 | 0.0222 | 2.13 | 4.05 | 1035246 |
| 3/4 13:15 | 17.22 | 6.01 | 0.0221 | 2.61 | 4.00 | 1268712 |
| 3/4 13:16 | 17.23 | 6.04 | 0.0222 | 2.13 | 4.06 | 1035899 |
| 3/4 13:17 | 17.29 | 6.04 | 0.0222 | 2.62 | 4.02 | 1268712 |
| 3/4 13:18 | 17.32 | 6.08 | 0.0224 | 2.62 | 4.10 | 1268712 |
| 3/4 13:19 | 17.36 | 6.11 | 0.0225 | 2.16 | 4.11 | 1035899 |
| 3/4 13:20 | 17.43 | 6.10 | 0.0224 | 2.16 | 4.04 | 1036554 |
| 3/4 13:21 | 17.36 | 6.10 | 0.0224 | 2.64 | 4.09 | 1269514 |
| 3/4 13:22 | 17.34 | 6.06 | 0.0223 | 2.63 | 4.03 | 1269514 |
| 3/4 13:23 | 17.39 | 6.10 | 0.0224 | 2.15 | 4.08 | 1036554 |
| 3/4 13:24 | 17.32 | 6.05 | 0.0222 | 2.63 | 4.00 | 1269514 |
| 3/4 13:25 | 17.29 | 6.06 | 0.0223 | 2.62 | 4.06 | 1270317 |
| Average (all) | 17.26 | 6.04 | 0.0222 | 2.47 | 4.04 | 1200649 |
| Total (all) | - | - | - | - | - | - |
| Minimum (all) | 16.99 | 5.94 | 0.0218 | 2.12 | 3.91 | 1035246 |
| Maximum (all) | 17.43 | 6.11 | 0.0225 | 2.64 | 4.11 | 1270317 |
| Average (valid values only) | 17.26 | 6.04 | 0.0222 | 2.47 | 4.04 | 1200649 |
| Total (valid values only) | - | - | - | - | - | - |
| Count (valid values only) | 24 | 24 | 24 | 24 | 24 | 24 |

Comment: Crude Charge Heater RATA - Run #7 Rev 1

CeDAR 1-Minute Data

Frontier Refining LLC

Data for 3/4/2014 1:33 PM thru 3/4/2014 1:55 PM

| Timestamp | (Crude Charge Heater) NOx ppm 1-Min | (Crude Charge Heater) NOx ppm @15% O2 1-Min | (Crude Charge Heater) NOx lb/mmBtu 1-Min | (Crude Charge Heater) NOx lb/hr 1-Min Avg | (Crude Charge Heater) O2% 1-Min | (Crude Charge Heater) Stack Flow Rate scf/hr 1-Min |
|-----------------------------|-------------------------------------|---|--|---|---------------------------------|--|
| 3/4 13:33 | 17.32 | 6.08 | 0.0222 | 2.63 | 4.01 | 1269514 |
| 3/4 13:34 | 17.29 | 6.06 | 0.0223 | 2.62 | 4.07 | 1270317 |
| 3/4 13:35 | 17.17 | 5.99 | 0.0220 | 2.60 | 4.00 | 1270317 |
| 3/4 13:36 | 17.27 | 6.05 | 0.0222 | 2.62 | 4.05 | 1269514 |
| 3/4 13:37 | 17.41 | 6.11 | 0.0225 | 2.64 | 4.10 | 1269514 |
| 3/4 13:38 | 17.48 | 6.12 | 0.0225 | 2.65 | 4.05 | 1269514 |
| 3/4 13:39 | 17.38 | 6.11 | 0.0225 | 2.15 | 4.12 | 1036554 |
| 3/4 13:40 | 17.37 | 6.10 | 0.0224 | 2.15 | 4.11 | 1036554 |
| 3/4 13:41 | 17.39 | 6.07 | 0.0223 | 2.64 | 4.00 | 1269514 |
| 3/4 13:42 | 17.34 | 6.09 | 0.0224 | 2.63 | 4.09 | 1269514 |
| 3/4 13:43 | 17.31 | 6.08 | 0.0223 | 2.62 | 4.06 | 1270317 |
| 3/4 13:44 | 17.39 | 6.09 | 0.0224 | 2.64 | 4.05 | 1270317 |
| 3/4 13:45 | 17.39 | 6.08 | 0.0223 | 2.64 | 4.02 | 1270317 |
| 3/4 13:46 | 17.42 | 6.11 | 0.0225 | 2.64 | 4.08 | 1269514 |
| 3/4 13:47 | 17.40 | 6.09 | 0.0224 | 2.64 | 4.04 | 1270317 |
| 3/4 13:48 | 17.36 | 6.08 | 0.0223 | 2.63 | 4.01 | 1270317 |
| 3/4 13:49 | 17.37 | 6.09 | 0.0224 | 2.63 | 4.07 | 1270317 |
| 3/4 13:50 | 17.46 | 6.11 | 0.0225 | 2.65 | 4.05 | 1269514 |
| 3/4 13:51 | 17.46 | 6.12 | 0.0225 | 2.65 | 4.07 | 1269514 |
| 3/4 13:52 | 17.46 | 6.12 | 0.0225 | 2.65 | 4.06 | 1269514 |
| 3/4 13:53 | 17.42 | 6.10 | 0.0224 | 2.64 | 4.04 | 1269514 |
| 3/4 13:54 | 17.43 | 6.10 | 0.0224 | 2.64 | 4.05 | 1269514 |
| 3/4 13:55 | 17.44 | 6.11 | 0.0224 | 2.64 | 4.05 | 1269514 |
| Average (all) | 17.38 | 6.09 | 0.0224 | 2.59 | 4.05 | 1249536 |
| Total (all) | - | - | - | - | - | - |
| Minimum (all) | 17.17 | 5.99 | 0.0220 | 2.15 | 4.00 | 1036554 |
| Maximum (all) | 17.48 | 6.12 | 0.0225 | 2.65 | 4.12 | 1270317 |
| Average (valid values only) | 17.38 | 6.09 | 0.0224 | 2.59 | 4.05 | 1249536 |
| Total (valid values only) | - | - | - | - | - | - |
| Count (valid values only) | 23 | 23 | 23 | 23 | 23 | 23 |

Comment: Crude Charge Heater RATA - Run #8 Rev 1

CeDAR 1-Minute Data

Frontier Refining LLC

Data for 3/4/2014 2:04 PM thru 3/4/2014 2:24 PM

| Timestamp | (Crude Charge Heater) NOx ppm 1-Min | (Crude Charge Heater) NOx ppm @15% O2 1-Min | (Crude Charge Heater) NOx lb/mmBtu 1-Min | (Crude Charge Heater) NOx lb/hr 1-Min Avg | (Crude Charge Heater) O2% 1-Min | (Crude Charge Heater) Stack Flow Rate scf/hr 1-Min |
|-----------------------------|-------------------------------------|---|--|---|---------------------------------|--|
| 3/4 14:04 | 17.41 | 6.06 | 0.0223 | 2.64 | 3.96 | 1268712 |
| 3/4 14:05 | 17.44 | 6.10 | 0.0224 | 2.64 | 4.03 | 1267912 |
| 3/4 14:06 | 17.43 | 6.09 | 0.0224 | 2.64 | 4.00 | 1267114 |
| 3/4 14:07 | 17.37 | 6.06 | 0.0223 | 2.63 | 4.00 | 1267114 |
| 3/4 14:08 | 17.33 | 6.06 | 0.0223 | 2.62 | 4.02 | 1267912 |
| 3/4 14:09 | 17.33 | 6.06 | 0.0223 | 2.62 | 4.03 | 1267912 |
| 3/4 14:10 | 17.33 | 6.07 | 0.0223 | 2.62 | 4.05 | 1267114 |
| 3/4 14:11 | 17.37 | 6.10 | 0.0224 | 2.63 | 4.09 | 1267114 |
| 3/4 14:12 | 17.35 | 6.05 | 0.0223 | 2.62 | 3.99 | 1268316 |
| 3/4 14:13 | 17.27 | 6.03 | 0.0221 | 2.61 | 3.99 | 1268316 |
| 3/4 14:14 | 17.28 | 6.08 | 0.0223 | 2.61 | 4.12 | 1268316 |
| 3/4 14:15 | 17.35 | 6.08 | 0.0223 | 2.62 | 4.06 | 1268316 |
| 3/4 14:16 | 17.42 | 6.12 | 0.0225 | 2.63 | 4.11 | 1268316 |
| 3/4 14:17 | 17.38 | 6.06 | 0.0223 | 2.63 | 3.98 | 1265521 |
| 3/4 14:18 | 17.31 | 6.05 | 0.0222 | 2.62 | 4.02 | 1265521 |
| 3/4 14:19 | 17.28 | 6.03 | 0.0221 | 2.61 | 3.98 | 1268316 |
| 3/4 14:20 | 17.21 | 6.00 | 0.0221 | 2.60 | 3.98 | 1268316 |
| 3/4 14:21 | 17.25 | 6.02 | 0.0221 | 2.61 | 3.98 | 1265521 |
| 3/4 14:22 | 17.38 | 6.05 | 0.0223 | 2.63 | 3.96 | 1265521 |
| 3/4 14:23 | 17.35 | 6.04 | 0.0222 | 2.62 | 3.96 | 1265521 |
| 3/4 14:24 | 17.20 | 5.99 | 0.0220 | 2.60 | 3.96 | 1265521 |
| Average (all) | 17.34 | 6.06 | 0.0223 | 2.62 | 4.01 | 1266583 |
| Total (all) | -- | -- | -- | -- | -- | -- |
| Minimum (all) | 17.20 | 5.99 | 0.0220 | 2.60 | 3.96 | 1265521 |
| Maximum (all) | 17.44 | 6.12 | 0.0225 | 2.64 | 4.12 | 1268712 |
| Average (valid values only) | 17.34 | 6.06 | 0.0223 | 2.62 | 4.01 | 1266583 |
| Total (valid values only) | -- | -- | -- | -- | -- | -- |
| Count (valid values only) | 21 | 21 | 21 | 21 | 21 | 21 |

Comment: Crude Charge Heater RATA Data - Run #9

CeDAR 1-Minute Data
Frontier Refining LLC
Data for 3/4/2014 2:40 PM thru 3/4/2014 3:00 PM

| Timestamp | (Crude Charge Heater) NOx ppm 1-Min | (Crude Charge Heater) NOx ppm @15% O2 1-Min | (Crude Charge Heater) NOx lb/mmBtu 1-Min | (Crude Charge Heater) NOx lb/hr 1-Min Avg | (Crude Charge Heater) O2% 1-Min | (Crude Charge Heater) Stack Flow Rate scf/hr 1-Min |
|-----------------------------|-------------------------------------|---|--|---|---------------------------------|--|
| 3/4 14:40 | 17.30 | 6.01 | 0.0221 | 2.61 | 3.91 | 1263143 |
| 3/4 14:41 | 17.16 | 5.96 | 0.0219 | 2.59 | 3.91 | 1262353 |
| 3/4 14:42 | 17.14 | 5.95 | 0.0219 | 2.58 | 3.91 | 1262353 |
| 3/4 14:43 | 17.29 | 6.01 | 0.0221 | 2.61 | 3.94 | 1262353 |
| 3/4 14:44 | 17.46 | 6.07 | 0.0223 | 2.63 | 3.93 | 1262353 |
| 3/4 14:45 | 17.43 | 6.03 | 0.0222 | 2.63 | 3.85 | 1262353 |
| 3/4 14:46 | 17.36 | 6.06 | 0.0223 | 2.62 | 3.99 | 1261565 |
| 3/4 14:47 | 17.40 | 6.09 | 0.0224 | 2.62 | 4.05 | 1261565 |
| 3/4 14:48 | 17.41 | 6.05 | 0.0222 | 2.62 | 3.91 | 1262353 |
| 3/4 14:49 | 17.35 | 6.01 | 0.0221 | 2.61 | 3.87 | 1261565 |
| 3/4 14:50 | 17.28 | 6.01 | 0.0221 | 2.60 | 3.94 | 1261565 |
| 3/4 14:51 | 17.19 | 5.99 | 0.0220 | 2.59 | 3.98 | 1261565 |
| 3/4 14:52 | 17.09 | 5.98 | 0.0220 | 2.57 | 4.04 | 1261565 |
| 3/4 14:53 | 17.12 | 5.96 | 0.0219 | 2.58 | 3.94 | 1262353 |
| 3/4 14:54 | 17.18 | 5.99 | 0.0220 | 2.59 | 3.99 | 1261565 |
| 3/4 14:55 | 17.19 | 6.00 | 0.0220 | 2.59 | 3.99 | 1261565 |
| 3/4 14:56 | 17.18 | 6.00 | 0.0221 | 2.59 | 4.01 | 1261565 |
| 3/4 14:57 | 17.20 | 6.01 | 0.0221 | 2.59 | 4.01 | 1261565 |
| 3/4 14:58 | 17.18 | 5.98 | 0.0220 | 2.59 | 3.98 | 1261565 |
| 3/4 14:59 | 17.22 | 6.02 | 0.0221 | 2.59 | 4.01 | 1261565 |
| 3/4 15:00 | 17.31 | 6.04 | 0.0222 | 2.61 | 4.00 | 1260778 |
| Average (all) | 17.26 | 6.01 | 0.0221 | 2.60 | 3.98 | 1261865 |
| Total (all) | — | — | — | — | — | — |
| Minimum (all) | 17.09 | 5.95 | 0.0219 | 2.57 | 3.85 | 1260778 |
| Maximum (all) | 17.46 | 6.09 | 0.0224 | 2.63 | 4.05 | 1263143 |
| Average (valid values only) | 17.26 | 6.01 | 0.0221 | 2.60 | 3.98 | 1261865 |
| Total (valid values only) | — | — | — | — | — | — |
| Count (valid values only) | 21 | 21 | 21 | 21 | 21 | 21 |

Comment: Crude Charge Heater RATA Data - Run #10

Fuel Gas BTU content

Crude Charge Heater

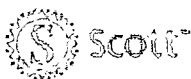
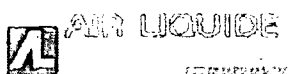
3/4/14

| | |
|-----------------------------|----------|
| WebBLISS | |
| Ad | |
| BAYTEK | |
| Total Samples: 1 | |
| Hydrogen (mol%) | 21.7 |
| Methane (mol%) | 43.25 |
| Ethane (mol%) | 9.65 |
| Ethylene (mol%) | 3.41 |
| Propene (mol%) | 5.10 |
| Propylene (mol%) | 6.18 |
| Isobutane (mol%) | 0.77 |
| n-Butane (mol%) | 0.82 |
| 1-Butene (mol%) | 0.23 |
| Isobutene (mol%) | 0.21 |
| t-2-Butene (mol%) | 0.25 |
| c-2-Butene (mol%) | 0.16 |
| 1,3-Butadiene (mol%) | 0.00 |
| Isopentene (mol%) | 0.35 |
| N-Pentane (mol%) | 0.13 |
| C6+ (mol%) | 0.00 |
| H2S (mol%) | 0.00 |
| O2 (mol%) | 0.52 |
| N2 (mol%) | 1.66 |
| CO2 (mol%) | 0.17 |
| CO (mol%) | 4.50 |
| Gas Specific Gravity (mol%) | 0.7002 |
| Ideal Gross BTUs (mol%) | 1,141.63 |
| Avg Molecular Weight (mol%) | 20.24 |
| Local intranet Protec 100 | |

Appendix 4
Calibration Data and Certificates

3/17/2014

Air Liquide America Specialty Gases LLC



500 WEAVER PARK RD, LONGMONT, CO 80501 Phone: 888-253-1635 Fax: 303-772-7673

RATA CLASS

Guaranteed +/- 1% Accuracy

CERTIFICATE OF ACCURACY: EPA Protocol Gas

Assay Laboratory - PGVP Vendor ID: A42013
 AIR LIQUIDE AMERICA SPECIALTY GASES LLC
 500 WEAVER PARK RD
 LONGMONT, CO 80501

P.O. No.: D00FC
 Document #: 53048587-014
 Poles 5:5% CO2, 5% O2/N2

Customer
 AIR POLLUTION TESTING INC
 5530 MARSHALL STREET
 ARVADA CO 80002
 US

ANALYTICAL INFORMATION Gas Type : CO2,O2,BALN

This certification was performed according to EPA Traceability Protocol For Assay & Certification of Gaseous Calibration Standards;
 Procedure G-1, EPA/800/R-12/531; May 2012. Do not use this standard if pressure is less than 100 psig.

Cylinder Number: ALM000809
 Cylinder Pressure: 1800 PSIG

Certification Date: 04Dec2013

Exp. Date: 05Dec2021
 Batch No: LGM0104482

| COMPONENT | CERTIFIED CONCENTRATION (Moles) | ACCURACY (ABSOLUTE/RELATIVE) |
|----------------|---------------------------------|------------------------------|
| CARBON DIOXIDE | 4.98 % | 0.03 % / 0.6 % |
| OXYGEN | 4.90 % | 0.04 % / 0.8 % |
| NITROGEN | BALANCE | |

TRACEABILITY**REFERENCE STANDARD**

| COMPONENT | CONCENTRATION | UNCERTAINTY | CYLINDER | TYPE/CRM SAMPLE | EXP. DATE |
|----------------|---------------|-------------|----------|-----------------|-----------|
| CARBON DIOXIDE | 4.9540 % | 0.0250 % | K014222 | NTRM 2000 | 25Nov2017 |
| OXYGEN | 10.0300 % | 0.0700 % | K012175 | NTRM 2858 | 01Feb2016 |

ANALYTICAL METHOD

1st Analysis: 04Dec2013

| COMPONENT | INSTRUMENT | ANALYTICAL/PRINCIPLE | CALIBRATED | CONCENTRATION |
|----------------|-------------------------|----------------------|------------|---------------|
| CARBON DIOXIDE | MKS ONLINE/2030/0928082 | FTIR | 13Nov2013 | 4.980 % |

1st Analysis: 26Nov2013

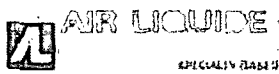
| COMPONENT | INSTRUMENT | ANALYTICAL/PRINCIPLE | CALIBRATED | CONCENTRATION |
|-----------|------------------|----------------------|------------|---------------|
| OXYGEN | OXYMAT/6E/W5-951 | PARAMAGNETIC | 11Nov2013 | 4.800 % |

QUALITY ASSURANCE

APPROVED BY: JON WITZAK
 (signature on file)

3/4/2014

Air Liquide America Specialty Gases LLC



600 WEAVER PARK RD, LONGMONT, CO 80501 Phone: 888-253-1835 Fax: 303-772-7873

RATA CLASS*Guaranteed +/- 1% Accuracy***CERTIFICATE OF ACCURACY: EPA Protocol Gas**

Assay Laboratory - PGVP Vendor ID: A42013
 AIR LIQUIDE AMERICA SPECIALTY GASES LLC
 600 WEAVER PARK RD
 LONGMONT, CO 80501

P.O. No.: D00FC
 Document #: 53048587-001
 Folio #: 10% CO2, 10% O2/N2

Customer
 AIR POLLUTION TESTING INC
 6630 MARSHALL STREET
 ARVADA CO 80002
 US

ANALYTICAL INFORMATION Gas Type : CO2,O2,BALN

This certification was performed according to EPA Traceability Protocol For Assay & Certification of Gaseous Calibration Standards; Procedure G-1. EPA/800/R-12/531; May 2012. Do not use this standard if pressure is less than 100 psig.

Cylinder Number: 1L2200
 Cylinder Pressure: 1800 PSIG

Certification Date: 04Dec2013

Exp. Date: 05Dec2021
 Batch No: LGM0104489

| COMPONENT | CERTIFIED CONCENTRATION (Moles) | ACCURACY (ABSOLUTE / RELATIVE) |
|----------------|---------------------------------|--------------------------------|
| CARBON DIOXIDE | 10.00 % | 0.08 % / 0.8 % |
| OXYGEN | 9.83 % | 0.07 % / 0.7 % |
| NITROGEN | BALANCE | |

TRACEABILITY**REFERENCE STANDARD**

| COMPONENT | CONCENTRATION | UNCERTAINTY | CYLINDER | TYPE/CRM SAMPLE | EXP. DATE |
|----------------|---------------|-------------|----------|-----------------|-----------|
| CARBON DIOXIDE | 17.8700 % | 0.1100 % | K022438 | NTRM 1800 | 01Mar2018 |
| OXYGEN | 10.0300 % | 0.0700 % | K012175 | NTRM 2658 | 01Feb2018 |

ANALYTICAL METHOD

1st Analysis: 04Dec2013

| COMPONENT | INSTRUMENT | ANALYTICAL/PRINCIPLE | CALIBRATED | CONCENTRATION |
|----------------|-------------------------|----------------------|------------|---------------|
| CARBON DIOXIDE | MKS ONLINE/2030/0829082 | FTIR | 13Nov2013 | 10.00 % |

1st Analysis: 25Nov2013

| COMPONENT | INSTRUMENT | ANALYTICAL/PRINCIPLE | CALIBRATED | CONCENTRATION |
|-----------|------------------|----------------------|------------|---------------|
| OXYGEN | OXYMAT76E/WS-851 | PARAMAGNETIC | 11Nov2013 | 9.830 % |

QUALITY ASSURANCE

APPROVED BY: JON WITZAK
 (signature on file)

70 AIR LIQUIDE

RATA CLASS

Dual-Analyzed Calibration Standard

500 WEAVER PARK RD, LONGMONT, CO 80501

Phone: 888-253-1635

Fax: 303-772-7673

CERTIFICATE OF ACCURACY: Interference Free™ Multi-Component EPA Protocol Gas

Assay Laboratory - PGVP Vendor ID: A42013

AIR LIQUIDE AMERICA SPECIALTY GASES LLC
600 WEAVER PARK RD
LONGMONT, CO 80501

P.O. No.: DOOFC
Document #: 60761111-003

Customer
AIR POLLUTION TESTING INC

5530 MARSHALL STREET
ARVADA CO 80002
US

ANALYTICAL INFORMATION

Gas Type: CO2.O2.BALN

This certification was performed according to EPA Traceability Protocol For Assay & Certification of Gaseous Calibration Standards; Procedure G-1; September, 1997.

Cylinder Number: ALM008281
Cylinder Pressure***: 1993 PSIG

Certification Date: 22May2013

Exp. Date: 23May2021
Batch No: LGM0088835

COMPONENT
CARBON DIOXIDE
OXYGEN
NITROGEN

CERTIFIED CONCENTRATION (Moles)
19.7 %
21.1 %
BALANCE

ACCURACY**
+/- 1%
+/- 1%

TRACEABILITY
Direct NIST and VSL

*** Do not use when cylinder pressure is below 150 psig.

** Analytical accuracy is based on the requirements of EPA Protocol Procedure G1, September 1997.

REFERENCE STANDARD

| TYPE/ARM NO. | EXPIRATION DATE | CYLINDER NUMBER | CONCENTRATION | COMPONENT |
|--------------|-----------------|-----------------|---------------|----------------|
| NTRM 1800 | 01Mar2018 | K022438 | 17.87 % | CARBON DIOXIDE |
| NTRM 2888 | 01Feb2016 | K012176 | 10.03 % | OXYGEN |

INSTRUMENTATION

INSTRUMENT/MODEL/SERIAL#
FTIR/0929062
OXYMAT/6E/W6-951

DATE LAST CALIBRATED
18May2013
20May2013

ANALYTICAL PRINCIPLE
FTIR
PARAMAGNETIC

ANALYZER READINGS

(Z = Zero Gas R = Reference Gas T = Test Gas r = Correlation Coefficient)

First Triad Analysis

CARBON DIOXIDE

Date: 21May2013 Response Unit: %
Z1 = -0.00091 R1 = 17.85818 T1 = 19.87284
R2 = 17.88036 Z2 = 0.00008 T2 = 19.87769
Z3 = 0.00294 T3 = 19.88846 R3 = 17.88415
Avg. Concentration: 19.87 %

OXYGEN

Date: 22May2013 Response Unit: VOLTS
Z1 = 0.00000 R1 = 10.05000 T1 = 21.09000
R2 = 10.04000 Z2 = 0.00000 T2 = 21.09000
Z3 = 0.00000 T3 = 21.09000 R3 = 10.04000
Avg. Concentration: 21.05 %

Second Triad Analysis

Calibration Curve

Concentration = A + Bx + Cx2 + Dx3 + Ex4
r = 0.999989
Constants: A = -4.53571E+1
B = 1.38847E+0 C = 0.00000E+0
D = 0.00000E+0 E = 0.00000E+0

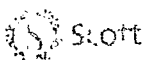
Concentration = A + Bx + Cx2 + Dx3 + Ex4
r = 0.999889
Constants: A = 0.00327224
B = 0.998213531 C =
D = E =

APPROVED BY:

ADAM HANLEY



AIR LIQUIDE Air Liquide America
Specialty Gases LLC



RATA CLASS

Guaranteed +/- 1% Accuracy

600 WEAVER PARK RD, LONGMONT, CO 80501

Phone: 888-263-1636

Fax: 303-772-7673

CERTIFICATE OF ACCURACY: EPA Protocol Gas

Assay Laboratory - PGVP Vendor ID: A42013
AIR LIQUIDE AMERICA SPECIALTY GASES LLC
600 WEAVER PARK RD
LONGMONT, CO 80501

P.O. No.: 000FC
Document #: 52075783-003
Folio #: 18.2PPM NO/N2

Customer
AIR POLLUTION TESTING INC
5530 MARSHALL STREET
ARVADA CO 80002
US

ANALYTICAL INFORMATION

Gas Type: NO, BALN

This certification was performed according to EPA Traceability Protocol for Assay & Certification of Gaseous Calibration Standards; Procedure G-1, EPA/600/R-12/631; May 2012. Do not use this standard if pressure is less than 100 psig.

Cylinder Number: AAL073323
Cylinder Pressure: 2000 PSIG

Certification Date: 30Sep2013

Exp. Date: 01Oct2016
Batch No: LGM0098323

COMPONENT

NITRIC OXIDE
NITROGEN - OXYGEN FREE

CERTIFIED CONCENTRATION (Moles)

18.1 PPM
BALANCE

ACCURACY (ABSOLUTE / RELATIVE)

0.2 PPM / 1.2 %

TOTAL OXIDES OF NITROGEN

18.2 PPM

Reference Value Only

TRACEABILITY

REFERENCE STANDARD

COMPONENT
NITRIC OXIDE

CONCENTRATION
10.1100 PPM

UNCERTAINTY
0.1200 PPM

CYLINDER
KAL004116

TYPE/SRM SAMPLE
NTRM 2828

EXP. DATE
05Jan2016

ANALYTICAL METHOD

1st Analysis: 23Sep2013

COMPONENT
NITRIC OXIDE

INSTRUMENT
NONOX/CLA-220/41528760062

ANALYTICAL/PRINCIPLE
CHEMILUMINESCENT

CALIBRATED
17Sep2013

CONCENTRATION
18.20 PPM

2nd Analysis: 30Sep2013

COMPONENT
NITRIC OXIDE

INSTRUMENT
NONOX/CLA-220/41528760062

ANALYTICAL/PRINCIPLE
CHEMILUMINESCENT

CALIBRATED
17Sep2013

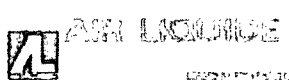
CONCENTRATION
18.06 PPM

APPROVED BY: _____

JOHN PETERK

3/17/2014

Air Liquide America Specialty Gases LLC



600 WEAVER PARK RD, LONGMONT, CO 80501 Phone: 888-253-1635 Fax: 303-772-7673

RATA CLASS

Guaranteed +/- 1% Accuracy

CERTIFICATE OF ACCURACY: EPA Protocol Gas

Assay Laboratory - PGVP Vendor ID: A42013
 AIR LIQUIDE AMERICA SPECIALTY GASES LLC
 600 WEAVER PARK RD
 LONGMONT, CO 80501

P.O. No.: D00FC
 Document #: 62078783-004
 Folio #: 38.2PPM NO/12

Customer
 AIR POLLUTION TESTING INC
 8830 MARSHALL STREET
 ARVADA CO 80002
 US

ANALYTICAL INFORMATION Gas Type : NO,BALN

This certification was performed according to EPA Traceability Protocol For Assay & Certification of Gaseous Calibration Standards;
 Procedure G-1. EPA/600/R-12/631; May 2012. Do not use this standard if pressure is less than 100 psig.

Cylinder Number: ALM048779
 Cylinder Pressure: 1800 PSIG

Certification Date: 30Sep2013

Exp. Date: 01Oct2018
 Batch No: LGM0099324

| COMPONENT | CERTIFIED CONCENTRATION (Moles) | ACCURACY (ABSOLUTE/RELATIVE) |
|--------------------------|---------------------------------|------------------------------|
| NITRIC OXIDE | 38.8 PPM | 0.5 PPM / 1.2 % |
| NITROGEN - OXYGEN FREE | BALANCE | |
| TOTAL OXIDES OF NITROGEN | 38.9 PPM | Reference Value Only |

TRACEABILITY**REFERENCE STANDARD**

| COMPONENT | CONCENTRATION | UNCERTAINTY | CYLINDER | TYPE&RM SAMPLE | EXP. DATE |
|--------------|---------------|-------------|-----------|----------------|-----------|
| NITRIC OXIDE | 20.3600 PPM | 0.2500 PPM | KAL004313 | NTRM 2629 | 31May2018 |

ANALYTICAL METHOD**1st Analysis: 23Sep2013**

| COMPONENT | INSTRUMENT | ANALYTICAL/PRINCIPLE | CALIBRATED | CONCENTRATION |
|--------------|-------------------------|----------------------|------------|---------------|
| NITRIC OXIDE | MKS ONLINE/2030/0929082 | FTIR | 08Sep2013 | 38.76 PPM |

2nd Analysis: 30Sep2013

| COMPONENT | INSTRUMENT | ANALYTICAL/PRINCIPLE | CALIBRATED | CONCENTRATION |
|--------------|-------------------------|----------------------|------------|---------------|
| NITRIC OXIDE | MKS ONLINE/2030/0929082 | FTIR | 08Sep2013 | 38.88 PPM |

QUALITY ASSURANCE

APPROVED BY: JON WITZAK
 (signature on file)



Environmental Supply Company, Inc.

ility Source Sampling Systems & Accessories

Wind Tunnel Pitot Calibration

S-type Pitot ID: **P-577** Date: **13-Feb-13**
Standard Pitot ID: **001** Personnel: **DH**
Cp(std): **0.99** Cp(actual): **0.837**
Part Number: **PPS12-Y-007.5** P_{bar}(In Hg): **29.09**
Test Velocity (fps): **50** T(°F): **47**

| A-SIDE | $\Delta P_{s,d}$ (in. H ₂ O) | ΔP_s (in. H ₂ O) | Cp(s) | Deviation* |
|--------|--|--|-------|------------|
| | 0.579 | 0.814 | 0.835 | -0.003 |
| | 0.589 | 0.811 | 0.843 | 0.005 |
| | 0.581 | 0.815 | 0.836 | -0.003 |
| | 0.584 | 0.811 | 0.840 | 0.001 |
| | AVERAGE | | 0.839 | 0.003 |
| | | Std deviation | 0.004 | |

| B-SIDE | $\Delta P_{s,d}$ (in. H ₂ O) | $\Delta P_{s,i}$ (in. H ₂ O) | Cp(s) | Deviation* |
|--------|--|--|-------|------------|
| | 0.581 | 0.820 | 0.833 | -0.003 |
| | 0.584 | 0.819 | 0.836 | 0.000 |
| | 0.588 | 0.819 | 0.838 | 0.003 |
| | 0.581 | 0.816 | 0.836 | 0.000 |
| | AVERAGE | | 0.836 | 0.001 |
| | | Std deviation | 0.002 | |

$$Cp(s) = Cp(std) \sqrt{\frac{\Delta P(std)}{\Delta P(s)}}$$

$$Cp(A) - Cp(B) = 0.003 \text{ \{must be <0.010\}}$$

$$*Deviation = \{Cp(s) - AVG Cp(s)\} \text{ \{must be <0.010\}}$$

Standard deviation of the deviations must be less than 0.02 for both sides.

Pitot tube S/N P-577 was calibrated in accordance with the CFR 40, Part 60 Appendix A, Method 2, Section 10.

David Hemmick
Signature

2-13-13
Date



**AIR
POLLUTION
TESTING, INC.**
DENVER, SALT LAKE CITY

DRY GAS METER AND PYROMETER PRE-CALIBRATION DATA

Flow Meter ID: MS-12
Flow: 2000 L/min
Flow Rate (L/min) (NTP): 2000

Location: Test Room

Reference Meter Calibration Data

| | Run #1 | Run #2 | Run #3 | Average |
|-----|--------|--------|--------|---------|
| Vol | 0.998 | 0.998 | 0.998 | 0.998 |
| Vol | 1.001 | 1.001 | 1.001 | 1.001 |
| Vol | 1.001 | 1.001 | 1.001 | 1.001 |

Reference Meter ID: 1
Reference Meter SN: 004000
Reference Meter Vol: 0.998
Calibration Date: 1/12/2014
API Recal Date: 1/12/2014

Dry Gas Meter Calibration Data

| Run #1 | Delta H ₂ O (H ₂ O) | Volume Meter (L/min) | Temp. In (°F) | Temp. Out (°F) | Volume Reference (L/min) | Temp. Ref. (°F) | Delta P (H ₂ O) | Vacuum (H ₂ O) | Time (min) |
|---------|---|----------------------|---------------|----------------|--------------------------|-----------------|----------------------------|---------------------------|------------|
| Start | 0.5 | 221.50 | 63 | 61 | 763.665 | 63 | 0.37 | 10 | 1:07 PM |
| Stop | 0.5 | 629.379 | 63 | 63 | 763.410 | 63 | 0.37 | 10 | 1:08 PM |
| Average | 0.5 | 6.650 | 63 | 63 | 8.790 | 63 | 0.38 | 10 | 1:08 |
| Run #2 | Delta H ₂ O (H ₂ O) | Volume Meter (L/min) | Temp. In (°F) | Temp. Out (°F) | Volume Reference (L/min) | Temp. Ref. (°F) | Delta P (H ₂ O) | Vacuum (H ₂ O) | Time (min) |
| Start | 1.5 | 630.000 | 64 | 62 | 767.180 | 63 | 0.91 | 10 | 1:07 PM |
| Stop | 1.5 | 637.640 | 67 | 63 | 767.310 | 64 | 0.90 | 10 | 1:07 PM |
| Average | 1.5 | 7.830 | 66 | 63 | 8.180 | 66 | 0.91 | 10 | 1:08 |
| Run #3 | Delta H ₂ O (H ₂ O) | Volume Meter (L/min) | Temp. In (°F) | Temp. Out (°F) | Volume Reference (L/min) | Temp. Ref. (°F) | Delta P (H ₂ O) | Vacuum (H ₂ O) | Time (min) |
| Start | 3.0 | 630.070 | 67 | 63 | 760.470 | 63 | 1.18 | 10 | 1:08 PM |
| Stop | 3.0 | 655.110 | 69 | 61 | 763.010 | 63 | 1.17 | 10 | 1:09 PM |
| Average | 3.0 | 11.110 | 68 | 64 | 11.230 | 63 | 1.18 | 10 | 1:08 |

Visual Leak Check
100 @ 3" H₂O Positive: X
100 @ 3" H₂O Negative: X

System Response Check
100 @ 3" H₂O: X
100 @ 3" H₂O: X

Visual System Check
Manometer O₂ Levels: X
Physical Inspection: X

Pyrometer Calibration Data

| Calibration Temp. Reading (°F) | Pyrometer Reading (°F) | ABS (Relative Difference) % R |
|--------------------------------|------------------------|-------------------------------|
| 0 | -2 | 0.4 |
| 50 | 48 | 0.8 |
| 100 | 98 | 0.7 |
| 150 | 148 | 0.7 |
| 250 | 248 | 0.7 |
| 350 | 348 | 0.4 |
| 450 | 448 | 0.0 |
| 550 | 548 | 0.0 |

Temp. Temp. Calibration ID: 2
Temp. Temp. Calibration ID: 2
Calibration Date: 1/12/2014
Report Date: 1/12/2014



**AIR
POLLUTION
TESTING, INC.**
DENVER, SALT LAKE CITY

DRY GAS METER AND PYROMETER POST-CALIBRATION DATA

| | |
|---------------------------|-----------|
| Job No. (J) | MS 12 |
| Date | 3/13/2014 |
| Operator (Name) (S/L/M/J) | ESB |
| Tester (S/L) | LD |

Reference Meter Calibration Data

| | Run #1 | Run #2 | Run #3 | Average |
|---------------------|--------|--------|--------|---------|
| Flow | 0.000 | 0.000 | 0.000 | 0.000 |
| Vol | 1.012 | 1.014 | 1.011 | 1.012 |
| Calibration Results | 1.52 | 1.52 | 1.51 | 1.52 |

| | |
|---------------------|----------|
| M 5 box Pro Yd. | 1.017 |
| Reference Meter ID | 2 |
| Reference Meter SN | 0044209 |
| Reference Meter Yd. | 0.000 |
| Calibration Date | 3/7/2014 |
| APT Recent Date | 6/7/2015 |

Dry Gas Meter Calibration Data

| Run #1 | Date H ₂ O (H ₂ O) | Volume Meter (ft ³) | Temp. In (°F) | Temp. Out (°F) | Volume Reference (ft ³) | Temp. Ref. (°F) | Date P (H ₂ O) | Viscosity (cP) | Time (min) |
|---------|--|---------------------------------|---------------|----------------|-------------------------------------|-----------------|---------------------------|----------------|------------|
| Start | 1.5 | 950.272 | 69 | 66 | 787.693 | 62 | 0.0 | 1.5 | 2:01 PM |
| Stop | 1.5 | 977.877 | 67 | 67 | 747.433 | 67 | 0.0 | 1.5 | 2:23 PM |
| Average | 1.5 | 10.286 | 68 | 67 | 19.266 | 67 | 0.00 | 1.5 | 24.0 |
| Run #2 | Date H ₂ O (H ₂ O) | Volume Meter (ft ³) | Temp. In (°F) | Temp. Out (°F) | Volume Reference (ft ³) | Temp. Ref. (°F) | Date P (H ₂ O) | Viscosity (cP) | Time (min) |
| Start | 1.5 | 977.577 | 67 | 67 | 747.433 | 67 | 0.00 | 1.5 | 2:30 PM |
| Stop | 1.5 | 987.433 | 69 | 68 | 769.730 | 68 | 0.0 | 1.5 | 2:41 PM |
| Average | 1.5 | 10.045 | 68 | 68 | 19.303 | 68 | 0.00 | 1.5 | 18.0 |
| Run #3 | Date H ₂ O (H ₂ O) | Volume Meter (ft ³) | Temp. In (°F) | Temp. Out (°F) | Volume Reference (ft ³) | Temp. Ref. (°F) | Date P (H ₂ O) | Viscosity (cP) | Time (min) |
| Start | 1.5 | 989.679 | 70 | 68 | 758.726 | 69 | 0.00 | 1.5 | 2:47 PM |
| Stop | 1.5 | 1004.604 | 70 | 68 | 774.351 | 70 | 0.0 | 1.5 | 3:09 PM |
| Average | 1.5 | 14.441 | 70 | 68 | 14.707 | 69 | 0.00 | 1.5 | 19.0 |

| | |
|--------------------------------------|---|
| Pinch Leak Check | |
| 0.00 0.3" H ₂ O Positive | N |
| 0.00 65.3" H ₂ O Negative | N |

| | |
|------------------------------|-----------|
| System Response Check | |
| REC Out (S) | Pass/Fail |
| Flow In | Pass/Fail |

| | |
|----------------------------|---|
| Visual System Check | |
| Manifold CO Levels | N |
| Physical Inspection | N |

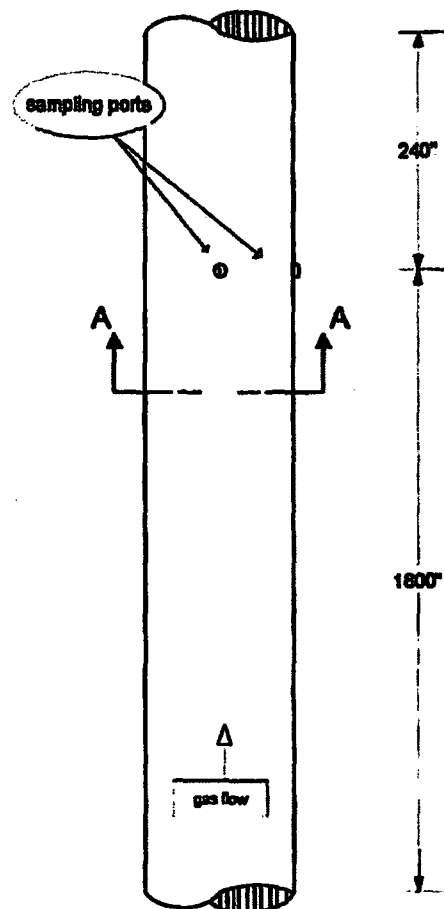
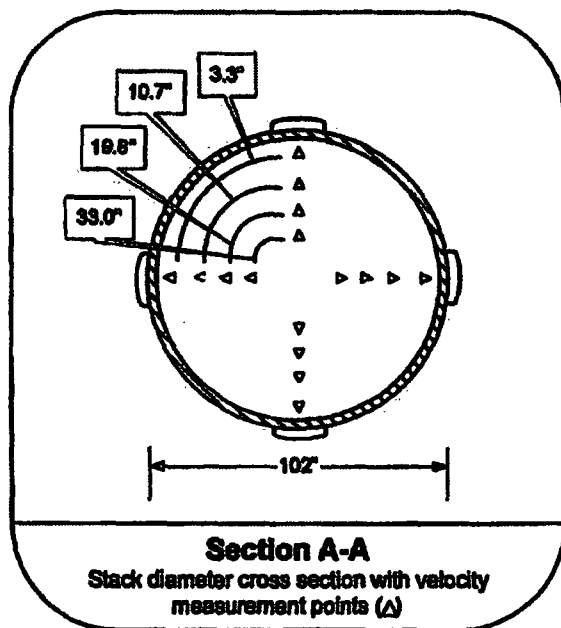
Pyrometer Calibration Data

| Calibration Temp. Reading (°F) | Pyrometer Reading (°F) | ABS (Relative Difference) % R |
|--------------------------------|------------------------|-------------------------------|
| 0 | 0 | 0.0 |
| 50 | 47 | 0.6 |
| 100 | 90 | 0.7 |
| 150 | 143 | 0.5 |
| 200 | 194 | 0.1 |
| 250 | 247 | 0.1 |
| 300 | 299 | 0.0 |
| Max. Absolute Difference | | 0.7 |

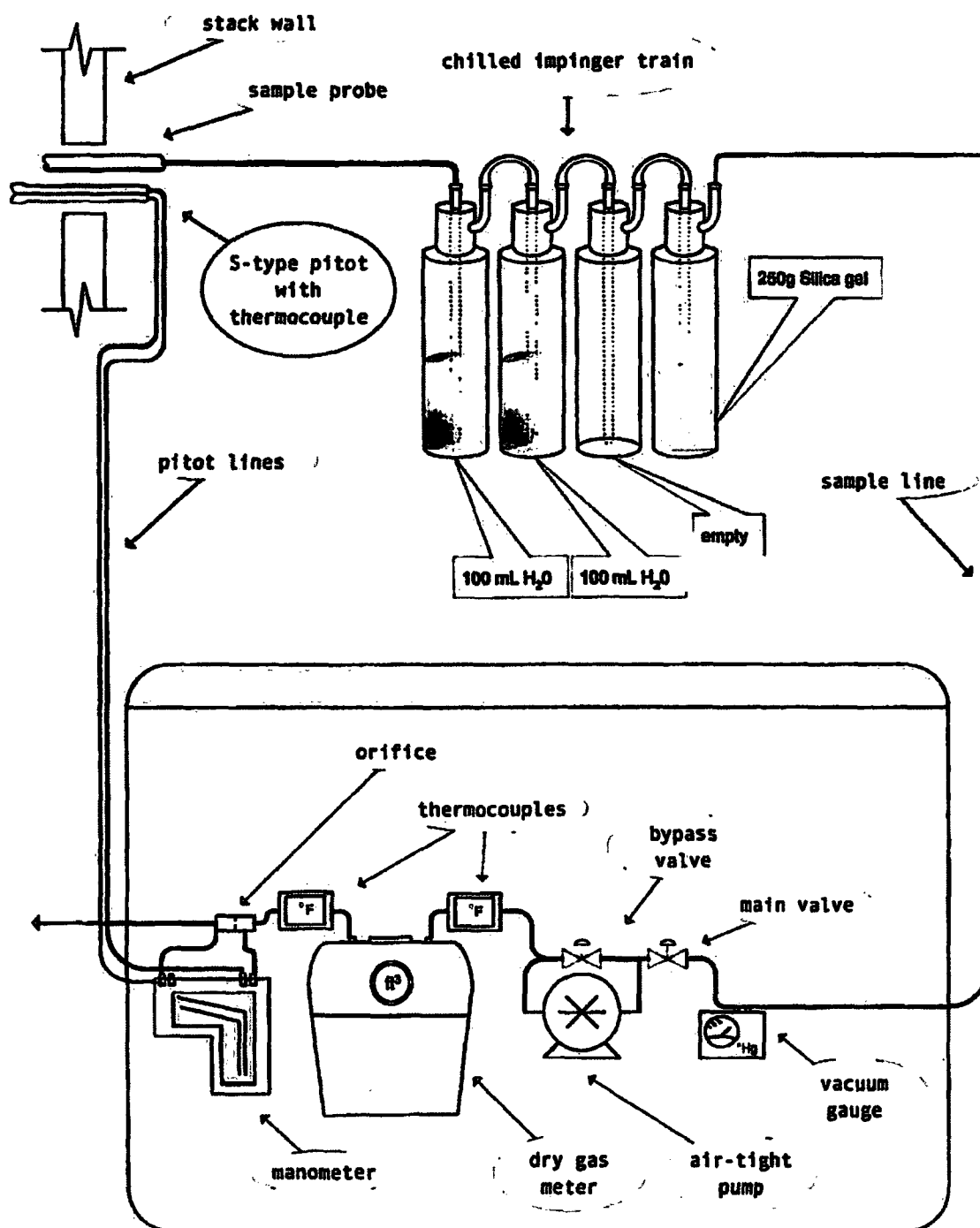
| | |
|----------------------------|-----------|
| Design Temp. Calibrator ID | 3 |
| Design Temp. Calibrator SN | T 203250 |
| Calibration Date | 6/13/2013 |
| Recent Date | 6/13/2014 |

Appendix 5

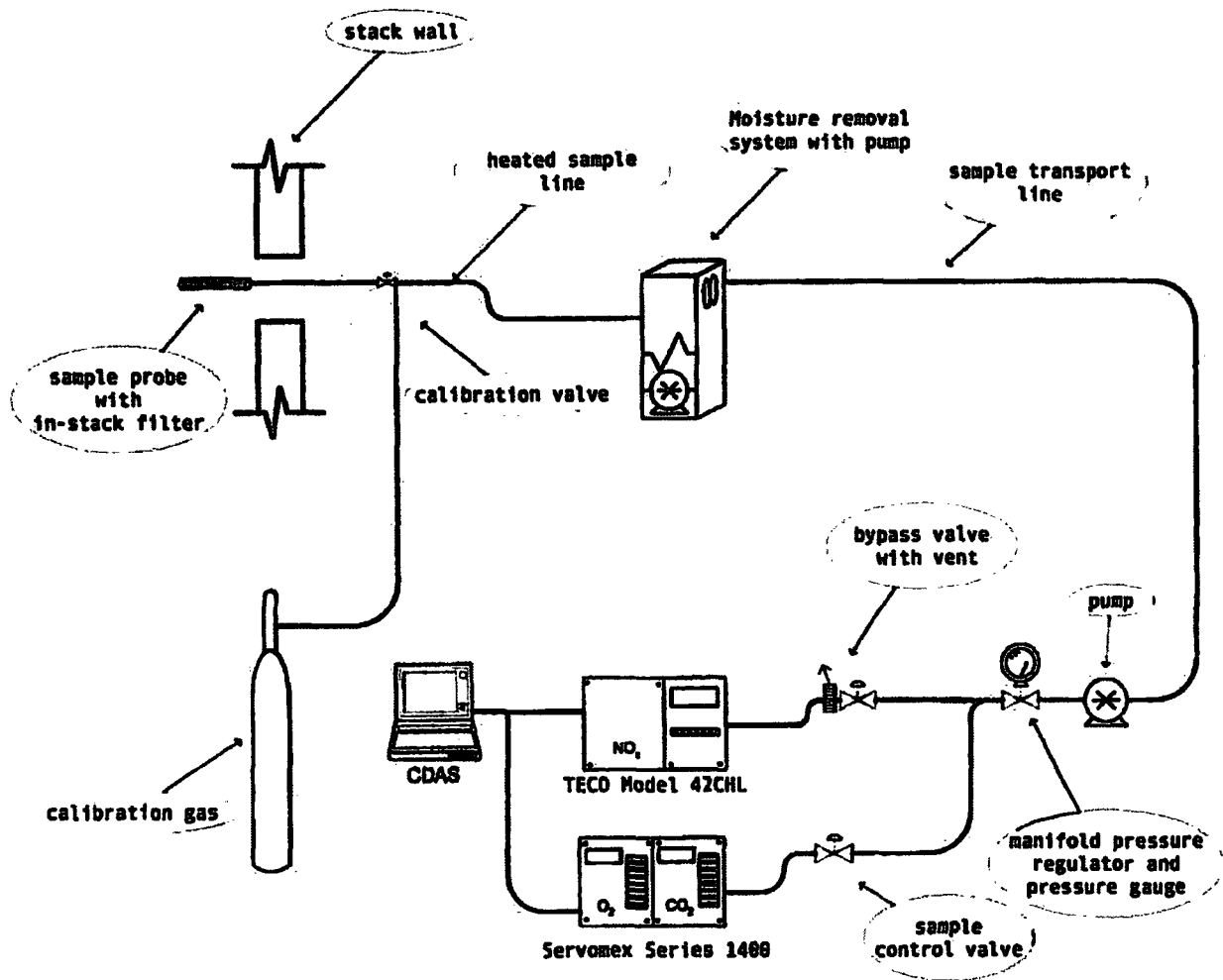
Schematics



Frontier Refinery
Crude Charge Heater
Stack Sampling Location Schematic
(not to scale)



EPA Methods 1, 2, & 4
sampling train schematic



**EPA Methods 3A & 7E
sampling train schematic**

Crude Charge Heater

7-Day Drift Test

January 21 – 27, 2014

Frontier Refining LLC **7-Day Drift Test**

Crude Charge Heater NOx ppm

| Time | Instrument Span | Zero Reference | Zero Measured | Zero Drift | Zero Drift Limit | Span Reference | Span Measured | Span Drift | Span Drift Limit | Status |
|-------------------|--------------------|-------------------|------------------|---------------|---------------------|-------------------|------------------|---------------|---------------------|---------|
| 01/21/14 06:10 AM | 100 | 0.00 | 0.28 | 0.28 | 2.50 | 89.90 | 89.27 | -0.63 | 2.50 | On-Line |
| 01/22/14 06:10 AM | 100 | 0.00 | 1.24 | 1.24 | 2.50 | 89.90 | 89.35 | -0.55 | 2.50 | On-Line |
| 01/23/14 06:10 AM | 100 | 0.00 | 1.22 | 1.22 | 2.50 | 89.90 | 89.13 | -0.77 | 2.50 | On-Line |
| 01/24/14 06:10 AM | 100 | 0.00 | 1.19 | 1.19 | 2.50 | 89.90 | 89.06 | -0.84 | 2.50 | On-Line |
| 01/25/14 06:10 AM | 100 | 0.00 | 1.68 | 1.68 | 2.50 | 89.90 | 88.40 | -1.50 | 2.50 | On-Line |
| 01/26/14 06:10 AM | 100 | 0.00 | 1.56 | 1.56 | 2.50 | 89.90 | 87.77 | -2.13 | 2.50 | On-Line |
| 01/27/14 06:10 AM | 100 | 0.00 | 0.85 | 0.85 | 2.50 | 89.90 | 88.85 | -1.05 | 2.50 | On-Line |

The 7-Day Drift Test has been passed.

Frontier Refining LLC

7-Day Drift Test

Crude Charge Heater O2%

| Time | Instrument Span | Zero Reference | Zero Measured | Zero Drift | Zero Drift Limit | Span Reference | Span Measured | Span Drift | Span Drift Limit | Status |
|-------------------|--------------------|-------------------|------------------|---------------|---------------------|-------------------|------------------|---------------|---------------------|---------|
| 01/21/14 06:10 AM | 25 | 0.000 | 0.006 | 0.006 | 0.500 | 20.900 | 20.919 | 0.019 | 0.500 | On-Line |
| 01/22/14 06:10 AM | 25 | 0.000 | 0.176 | 0.176 | 0.500 | 20.900 | 20.845 | -0.055 | 0.500 | On-Line |
| 01/23/14 06:10 AM | 25 | 0.000 | 0.159 | 0.159 | 0.500 | 20.900 | 20.928 | 0.028 | 0.500 | On-Line |
| 01/24/14 06:10 AM | 25 | 0.000 | 0.173 | 0.173 | 0.500 | 20.900 | 20.937 | 0.037 | 0.500 | On-Line |
| 01/25/14 06:10 AM | 25 | 0.000 | 0.267 | 0.267 | 0.500 | 20.900 | 20.966 | 0.066 | 0.500 | On-Line |
| 01/26/14 06:10 AM | 25 | 0.000 | 0.281 | 0.281 | 0.500 | 20.900 | 20.989 | 0.089 | 0.500 | On-Line |
| 01/27/14 06:10 AM | 25 | 0.000 | 0.137 | 0.137 | 0.500 | 20.900 | 20.981 | 0.081 | 0.500 | On-Line |

The 7-Day Drift Test has been passed.

Frontier Refining LLC

7-Day Drift Test

Crude Charge Heater Stack Flow Delta P

| Time | Instrument Span | Zero Reference | Zero Measured | Zero Drift | Zero Drift Limit | Span Reference | Span Measured | Span Drift | Span Drift Limit | Status |
|-------------------|--------------------|-------------------|------------------|---------------|---------------------|-------------------|------------------|---------------|---------------------|---------|
| 01/21/14 06:25 AM | 0.25 | 0.000 | 0.000 | 0.000 | 0.008 | 0.100 | 0.105 | 0.005 | 0.008 | On-Line |
| 01/21/14 09:17 AM | 0.25 | 0.000 | 0.000 | 0.000 | 0.008 | 0.100 | 0.106 | 0.006 | 0.008 | On-Line |
| 01/21/14 11:03 AM | 0.25 | 0.000 | 0.000 | 0.000 | 0.008 | 0.125 | 0.137 | 0.012 | 0.008 | On-Line |
| 01/21/14 11:06 AM | 0.25 | 0.000 | 0.000 | 0.000 | 0.008 | 0.125 | 0.149 | 0.024 | 0.008 | On-Line |
| 01/21/14 11:08 AM | 0.25 | 0.000 | 0.000 | 0.000 | 0.008 | 0.125 | 0.137 | 0.012 | 0.008 | On-Line |
| 01/21/14 11:12 AM | 0.25 | 0.000 | 0.000 | 0.000 | 0.008 | 0.125 | 0.143 | 0.018 | 0.008 | On-Line |
| 01/21/14 11:13 AM | 0.25 | 0.000 | 0.000 | 0.000 | 0.008 | 0.125 | 0.131 | 0.006 | 0.008 | On-Line |
| 01/21/14 12:58 PM | 0.25 | 0.000 | 0.000 | 0.000 | 0.008 | 0.125 | 0.133 | 0.008 | 0.008 | On-Line |
| 01/22/14 06:25 AM | 0.25 | 0.000 | 0.000 | 0.000 | 0.008 | 0.125 | 0.128 | 0.003 | 0.008 | On-Line |
| 01/23/14 06:25 AM | 0.25 | 0.000 | 0.000 | 0.000 | 0.008 | 0.125 | 0.127 | 0.002 | 0.008 | On-Line |
| 01/24/14 06:25 AM | 0.25 | 0.000 | 0.000 | 0.000 | 0.008 | 0.125 | 0.130 | 0.005 | 0.008 | On-Line |
| 01/25/14 06:25 AM | 0.25 | 0.000 | 0.000 | 0.000 | 0.008 | 0.125 | 0.127 | 0.002 | 0.008 | On-Line |
| 01/26/14 06:25 AM | 0.25 | 0.000 | 0.000 | 0.000 | 0.008 | 0.125 | 0.128 | 0.003 | 0.008 | On-Line |
| 01/27/14 06:25 AM | 0.25 | 0.000 | 0.000 | 0.000 | 0.008 | 0.125 | 0.130 | 0.005 | 0.008 | On-Line |

The 7-Day Drift Test has been passed

Crude Charge Heater

Linearity Test

March 6, 2014

Data Sheet for Crude Charge Heater CEM System Linearity Check

1. Date Audit Commenced: 6-Mar-14 Time Audit Commenced: 10:25 AM

2. Audit Gases Used for Test (All gases to be Protocol 1 Certified):

| Acceptable Audit Gas Ranges | Cylinder Number and Expiration Date | Audit Gas Concentrations | | +/- of Audit Gas Range |
|--|--|-----------------------------|-----|---------------------------|
| NO _x Low: 20 - 30 ppm | AAL073323 | 18.20 | ppm | 18.20% |
| | 1-Oct-16 | | | |
| NO _x Mid: 50 - 60 ppm | ALMO39664 | 39.40 | ppm | 39.40% |
| | 21-May-14 | | | |
| NO _x High: 90 - 100 ppm | ALMO46270 | 89.90 | ppm | 89.90% |
| | 20-Aug-21 | | | |
| O ₂ Low: 4 - 6% by volume | CC420681 | 4.96 | % | 4.96% |
| | 4-Mar-21 | | | |
| O ₂ Mid: 8 - 12% by volume | CC2603 | 9.95 | % | 9.95% |
| | 5-Mar-21 | | | |
| O ₂ High: 18 - 21% by volume | CC100519 | 17.84 | % | 17.84% |
| | 30-Sep-21 | | | |

Data Sheet for Crude Charge Heater CEM System Linearity Check

3. CEM System Response:

| | Low-Span NO _x | | Mid-Span NO _x | | High-Span NO _x | |
|------------------------|--------------------------|--------|--------------------------|--------|---------------------------|--------|
| | Analyzer | CeDAR5 | Analyzer | CeDAR5 | Analyzer | CeDAR5 |
| Run 1 | 18.20 | 17.79 | 38.65 | 37.66 | 90.10 | 87.75 |
| Run 2 | 18.26 | 17.78 | 38.56 | 37.56 | 89.95 | 87.60 |
| Run 3 | 18.38 | 17.91 | 38.61 | 37.62 | 89.85 | 87.42 |
| Avg. (d _m) | 18.28 | 17.83 | 38.61 | 37.61 | 89.97 | 87.59 |
| A | 0.44 | -2.05 | -2.01 | -4.53 | 0.07 | -2.57 |
| Pass? | Yes | Yes | Yes | Yes | Yes | Yes |

| | Low-Span O ₂ | | Mid-Span O ₂ | | High-Span O ₂ | |
|------------------------|-------------------------|--------|-------------------------|--------|--------------------------|--------|
| | Analyzer | CeDAR5 | Analyzer | CeDAR5 | Analyzer | CeDAR5 |
| Run 1 | 5.00 | 5.00 | 9.97 | 9.97 | 17.95 | 17.96 |
| Run 2 | 5.03 | 5.03 | 10.02 | 10.02 | 17.97 | 17.97 |
| Run 3 | 5.03 | 5.03 | 10.03 | 10.03 | 17.97 | 17.98 |
| Avg. (d _m) | 5.02 | 5.02 | 10.01 | 10.01 | 17.96 | 17.97 |
| A | 1.21 | 1.21 | 0.57 | 0.57 | 0.69 | 0.73 |
| Pass? | Yes | Yes | Yes | Yes | Yes | Yes |

4. Signature of Technician(s) performing Test:


Ron Anderson, Kevin Mafschner and/or Tad Milliken

Calculation of A:

$$A = (d_m - c_a) / c_a \times 100$$

A must be +/-5% to pass.

where:

A = accuracy of CEM

d_m = average of responses

c_a = certified audit value of gas

2Q14

DEPARTMENT OF ENVIRONMENTAL QUALITY
AIR QUALITY DIVISION
CONTINUOUS EMISSION MONITORING REPORT

FORM A

I. GENERAL INFORMATION

- A. Facility Name: FRONTIER REFINING LLC
- B. Process Unit/Pollutant Monitored: NO_x MONITOR – CRUDE CHARGE HEATER
- C. Applicable Permit Number or Regulation: Consent Decree
- D. Applicable Emission Limit: 0.031 lb/mmBtu (1-hr average); 6.3 lb/hr (1-hr average)

II. MONITOR INFORMATION

- A. Date of Original Monitor Installation: December 20, 2013 (New Installation)
- B. Date of Latest Monitor Certification: March 6, 2014

C. Pollutant/Opacity Monitor

- 1. Manufacturer: Teledyne Advanced Pollution Instrumentation
- 2. Model Number: T200H/M
- 3. Serial Number Main Chassis: 154
- 4. Basis of Measurement (If Applicable - Wet or Dry): Dry
- 5. Instrument Span, Range Value (Specify Units): 0 – 100 ppm NO_x

D. Diluent Monitor

- 1. Type of Monitor: O₂
- 2. Manufacturer: Teledyne Advanced Pollution Instrumentation
- 3. Model Number: T200H/M
- 4. Serial Number Main Chassis: 154
- 5. Basis of Measurement (If Applicable - Wet or Dry): Dry
- 6. Instrument Span, Range Value (Specify Units): 0 – 25 percent (%)

E. Flow Monitor

- 1. Type of Instrument: Microprocessor Based Delta P Pressure “Smart” Transmitter
- 2. Manufacturer: Air Monitor Corporation
- 3. Model Number: Veltron II
- 4. Serial Number Main Chassis: 81983A

Flow Monitor Probe

- 1. Type of Instrument (i.e. S-type Pitot Tube): Pitot Traverse
- 2. Manufacturer: Air Monitor Corporation
- 3. Model Number: Drawing No. W81983AA
- 4. Serial Number Main Chassis: 81983

F. Quality Assurance Data

- 1. QA Plan Date: To be Submitted
- 2. QA Plan Approval Date:

III. Operating/Monitoring Data

A. Quarter: 2 Year: 2014

B Total Hours in Reporting Period: 2184

C. Hours Unit Operated During the Reporting Period: 2184

Note: Include all unit operating time for the quarter including operating time associated with Startup/Shutdown and Chapter 1 Section 5 (Emergency/Abnormal) Operations. Report time in hours to one decimal place, i.e. 1902.8.

IV. Quarterly Audits/Monitoring System Modifications

A. Quarterly Audits

Type Audit: CGA

| | <u>Date Conducted</u> | <u>Pass</u> |
|----------------------------|-----------------------|-------------|
| Pollutant/Opacity Monitor: | <u>6/4/2014</u> | <u>Yes</u> |
| Diluent Monitor | <u>6/4/2014</u> | <u>Yes</u> |

Note: A copy of the quarterly audits shall be included with the corresponding quarterly excess emission report.

B. Equipment Replaced During Reporting Period: Changed NO_x Span Calibration Bottle:
Changed out Calibration Flow Regulator.

Note: Only equipment replacements or modifications to the system that could affect the ability of the continuous monitoring system to comply with the associated Performance Specification shall be reported.

V. Report Contact

A. Name: David Weeks, Environmental Engineer

B. Phone Number: (307) 771-8827

2Q14

EXCESS EMISSION SUMMARY REPORT
Crude Charge Heater NO_x (lb/mmmbtu) CEMS
1-hr average = 0.031 lb/mmmbtu

FORM B

| Emission Data Summary (12-hour average ppm) | | CMS Performance Report | |
|--|-------------|---|-------------|
| I. Duration of Excess Emission in Reporting Period Due to: | | I. CMS Downtime in Reporting Period Due to: | |
| A. Startup/Shutdown | 0.0 | A. Monitor Equipment Malfunction | 2.0 |
| B. Control Equipment Problems | 0.0 | B. Non-Monitor Equipment Malfunctions | 0.0 |
| C. Process Problem | 0.0 | C. Quality Assurance Calibration | 1.0 |
| D. Other Known Causes | 41.0 | D. Other Known Causes | 0.0 |
| E. Unknown Causes | 0.0 | E. Unknown Causes | 0.0 |
| II. Total Duration of Excess Emission | 41.0 | II. Total CMS Downtime | 3.0 |
| III. Total Duration of Excess Emissions x 100 divided by Total Source Operating Time minus Total CMS Downtime | 1.9% | III. Total CMS Downtime x 100 divided by Total Source Operating Time | 0.1% |

Total time of excess emission events due to emergency/abnormal operations: 0.

NOTE:

1. Only report excess emissions which occur when the unit/process is operating. Include all excess emissions in the Emission Data Summary including those excess emissions associated with startup/shutdown and those excess emissions associated with Chapter 1 Section 5 (Emergency/Abnormal) operations. Report times in hours for gaseous monitors and in tenths of an hour for opacity monitors. Include detailed excess emission information and causes in the Excess Emission Table (Form C).
2. Only report CEM downtime which occurs while the unit/process is operating. Report time in hours to one decimal point. Include detailed CEM downtime and causes in the Monitor Outage Table (Form D).
3. Include an explanation of what corrective actions were taken for total excess emissions or monitor downtime for the quarter (Emission Data Summary and CMS Performance Summary, Item III) greater than 5%. (See Instructions for further details.)
4. New CEMS installation on December 20, 2013. Data not valid until March 6, 2014 after 7-Day Drift Test, RATA and Linearity Test was successfully completed.

Crude Charge Heater Excess Emissions Summary

Frontier Refining LLC

NOx lb/mmBtu 1-Hr Excess Emissions for 4/1/2014 thru 6/30/2014

| Reason | Duration |
|---|-----------------|
| Crude Charge Heater Placed on Circulation in Natural Draft Mode | 19 hours |
| Forced Draft Fan off-line for Maintenance. Heater went to Natural Draft operation. This caused the Excess O2 to be elevated. | 6 hours |
| NOx lb/mmBtu Emission Exceedance - High Excess O2 | 14 hours |
| Process O2 was not Reading Correctly. Put into Natural Draft Mode. | 1 hour |
| The FD and ID fans were running with the output of the FD fan running higher than normal. The Process O2 on the TDC were Incorrect. | 1 hour |
| <hr/> | |
| Total duration of NOx lb/mmBtu 1-Hr excess emissions | 41 hours |
| Total operating time | 2184 hours |
| Operating time with excess emissions | 1.9% |

Comment: Form C - Excess Emissions Summary

Crude Charge Heater Excess Emissions

Frontier Refining LLC

NOx lb/mmBtu 1-Hr Excess Emissions for 4/1/2014 thru 6/30/2014

| Parameter | Start | End | Duration | Value | Min | Max | Limit | Reason | Action |
|-------------------|--------------------|----------|----------|--------|--------|--------|-------|---|--|
| NOx lb/mmBtu 1-Hr | 5/7/2014 7:00 AM | 12:59 PM | 6 hours | 0.0326 | 0.0324 | 0.0330 | 0.031 | Forced Draft Fan off-line for Maintenance, Heater went to Natural Draft operation. This caused the Excess O2 to be elevated. | Adjusted air registers to lower Excess O2. |
| NOx lb/mmBtu 1-Hr | 5/19/2014 7:00 AM | 7:59 AM | 1 hour | 0.0338 | 0.0338 | 0.0338 | 0.031 | Process O2 was not Reading Correctly. Put into Natural Draft Mode. | Adjusted Air Registers to Lower Excess O2. Returned to Forced Draft Mode. |
| NOx lb/mmBtu 1-Hr | 5/21/2014 3:00 AM | 3:59 AM | 1 hour | 0.0315 | 0.0315 | 0.0315 | 0.031 | The FD and ID fans were running with the output of the FD fan running higher than normal. The Process O2 on the TDC were incorrect. | Operator tried to manipulate the controllers at the fans from the TDC to get some air flow out the stack that helped get heat out. For safety, the unit charge was reduced and went to Natural Draft Mode. |
| NOx lb/mmBtu 1-Hr | 5/27/2014 3:00 AM | 3:59 AM | 1 hour | 0.0311 | 0.0311 | 0.0311 | 0.031 | NOx lb/mmBtu Emission Exceedance - High Excess O2 | Adjusted Excess O2 |
| NOx lb/mmBtu 1-Hr | 6/14/2014 12:00 AM | 2:59 AM | 3 hours | 0.0321 | 0.0318 | 0.0327 | 0.031 | NOx lb/mmBtu Emission Exceedance - High Excess O2 | Adjusted Excess O2 |
| NOx lb/mmBtu 1-Hr | 6/14/2014 8:00 PM | 11:59 PM | 4 hours | 0.0317 | 0.0316 | 0.0317 | 0.031 | NOx lb/mmBtu Emission Exceedance - High Excess O2 | Adjusted Excess O2 |
| NOx lb/mmBtu 1-Hr | 6/15/2014 12:00 AM | 5:59 AM | 6 hours | 0.0316 | 0.0314 | 0.0318 | 0.031 | NOx lb/mmBtu Emission Exceedance - High Excess O2 | Adjusted Excess O2 |
| NOx lb/mmBtu 1-Hr | 6/23/2014 2:00 AM | 8:59 PM | 19 hours | 0.0462 | 0.0418 | 0.0504 | 0.031 | Crude Charge Heater Placed on Circulation in Natural Draft Mode | Adjusted Air Registers and Returned to Forced Draft Mode |
| Total duration | | | 41 hours | | | | | | |

| Parameter | Start | End | Duration | Value | Min | Max | Limit | Reason | Action |
|-----------|-------|-----|----------|-------|-----|-----|-------|--------|--------|
|-----------|-------|-----|----------|-------|-----|-----|-------|--------|--------|

Comment: Form C - Excess Emissions Summary

Crude Charge Heater CEMS Downtime Summary

Frontier Refining LLC

NOx lb/mmBtu CEMS Downtime for 4/1/2014 thru 6/30/2014

| Reason | Duration |
|---|-----------------|
| Cylinder Gas Audit (CGA) | 1 hour |
| Failed Morning NOx ppm Span Calibration Check - OOC | 2 hours |
| <hr/> | |
| Total duration of NOx lb/mmBtu CEMS downtime | 3 hours |
| Total operating time | 2184 hours |
| Operating time with CEMS downtime | 0.1% |

Comment: Form D - Downtime Summary

Crude Charge Heater CEMS Downtime

Frontier Refining LLC

NOx lb/mmBtu CEMS Downtime for 4/1/2014 thru 6/30/2014

| Parameter | Start | End | Duration | Reason | Action |
|----------------|-------------------|---------|----------|---|------------------------|
| NOx lb/mmBtu | 5/31/2014 6:00 AM | 7:59 AM | 2 hours | Failed Morning NOx ppm Span Calibration Check - OOC | Ran Manual Calibration |
| NOx lb/mmBtu | 6/4/2014 9:00 AM | 9:59 AM | 1 hour | Cylinder Gas Audit (CGA) | Ran CGA on NOx and O2 |
| Total duration | | | 3 hours | | |

Comment: Form D - Downtime Summary

2Q14

EXCESS EMISSION SUMMARY REPORT
Crude Charge Heater NO_x (lb/hr) CEMS
1-hr average = 6.3 lb/hr

FORM B

| Emission Data Summary (lb/hr) | | CMS Performance Report | |
|--|-------------|---|-------------|
| I. Duration of Excess Emission in Reporting Period Due to: | | I. CMS Downtime in Reporting Period Due to: | |
| A. Startup/Shutdown | 0.0 | A. Monitor Equipment Malfunction | 29.0 |
| B. Control Equipment Problems | 0.0 | B. Non-Monitor Equipment Malfunctions | 0.0 |
| C. Process Problem | 0.0 | C. Quality Assurance Calibration | 1.0 |
| D. Other Known Causes | 0.0 | D. Other Known Causes | 3.0 |
| E. Unknown Causes | 0.0 | E. Unknown Causes | 0.0 |
| II. Total Duration of Excess Emission | 0.0 | II. Total CMS Downtime | 33.0 |
| III. Total Duration of Excess Emissions x 100 divided by Total Source Operating Time minus Total CMS Downtime | 0.0% | III. Total CMS Downtime x 100 divided by Total Source Operating Time | 1.5% |

Total time of excess emission events due to emergency/abnormal operations: 0.

NOTE:

1. Only report excess emissions which occur when the unit/process is operating. Include all excess emissions in the Emission Data Summary including those excess emissions associated with startup/shutdown and those excess emissions associated with Chapter 1 Section 5 (Emergency/Abnormal) operations. Report times in hours for gaseous monitors and in tenths of an hour for opacity monitors. Include detailed excess emission information and causes in the Excess Emission Table (Form C).
2. Only report CEM downtime which occurs while the unit/process is operating. Report time in hours to one decimal point. Include detailed CEM downtime and causes in the Monitor Outage Table (Form D).
3. Include an explanation of what corrective actions were taken for total excess emissions or monitor downtime for the quarter (Emission Data Summary and CMS Performance Summary, Item III) greater than 5%. (See Instructions for further details.)
4. New CEMS installation on December 20, 2013. Data not valid until March 6, 2014 after 7-Day Drift Test, RATA and Linearity Test was successfully completed.

Crude Charge Heater Excess Emissions Summary

Frontier Refining LLC

NOx lbs 1-Hr Excess Emissions for 4/1/2014 thru 6/30/2014

| Reason | Duration |
|---|------------|
| <i>There are no excess emissions for this report.</i> | |
| Total duration of NOx lbs 1-Hr excess emissions | 0 |
| Total operating time | 2184 hours |
| Operating time with excess emissions | 0.0% |
| Comment: Form C - Excess Emissions Summary | |

Crude Charge Heater CEMS Downtime Summary

Frontier Refining LLC

NOx lbs CEMS Downtime for 4/1/2014 thru 6/30/2014

| Reason | Duration |
|--|-----------------|
| Cylinder Gas Audit (CGA) | 1 hour |
| Failed Morning NOx ppm Span Calibration Check - OOC | 2 hours |
| Failed Morning Stack Flow Delta P Span Calibration Check | 22 hours |
| Failed Morning Stack Flow Delta P Span Calibration Check - OOC | 1 hour |
| Maintenance - Stack Flow | 1 hour |
| Maintenance - Stack Flow System | 2 hours |
| Stack Flow Delta P Transmitter Malfunction | 4 hours |
| <hr/> | |
| Total duration of NOx lbs CEMS downtime | 33 hours |
| Total operating time | 2184 hours |
| Operating time with CEMS downtime | 1.5% |

Comment: Form D - Downtime Summary

Crude Charge Heater CEMS Downtime

Frontier Refining LLC

NOx lbs CEMS Downtime for 4/1/2014 thru 6/30/2014

| Parameter | Start | End | Duration | Reason | Action |
|----------------|--------------------|----------|----------|--|--|
| NOx lbs | 4/1/2014 6:00 AM | 7:59 AM | 2 hours | Failed Morning Stack Flow Delta P Span Calibration Check | Passed Manual Calibration |
| NOx lbs | 4/2/2014 6:00 AM | 7:59 AM | 2 hours | Failed Morning Stack Flow Delta P Span Calibration Check | Passed Manual Calibration |
| NOx lbs | 4/3/2014 7:00 AM | 9:59 AM | 3 hours | Failed Morning Stack Flow Delta P Span Calibration Check | Passed Manual Calibration |
| NOx lbs | 4/13/2014 5:00 AM | 4:59 PM | 12 hours | Failed Morning Stack Flow Delta P Span Calibration Check | Passed Manual Calibration |
| NOx lbs | 4/28/2014 6:00 AM | 8:59 AM | 3 hours | Failed Morning Stack Flow Delta P Span Calibration Check | Passed Manual Calibration |
| NOx lbs | 4/28/2014 10:00 AM | 11:59 AM | 2 hours | Maintenance - Stack Flow System | Rebuilt Regulator and found obstruction in Needle Valve |
| NOx lbs | 5/31/2014 6:00 AM | 7:59 AM | 2 hours | Failed Morning NOx ppm Span Calibration Check - OOC | Ran Manual Calibration |
| NOx lbs | 6/4/2014 9:00 AM | 9:59 AM | 1 hour | Cylinder Gas Audit (CGA) | Ran CGA on NOx and O2 |
| NOx lbs | 6/5/2014 5:00 AM | 5:59 AM | 1 hour | Failed Morning Stack Flow Delta P Span Calibration Check - OOC | Calibrated stack flow, adjusted span, ran validation. |
| NOx lbs | 6/21/2014 6:00 AM | 9:59 AM | 4 hours | Stack Flow Delta P Transmitter Malfunction | Adjusted and Ran Manual Calibration |
| NOx lbs | 6/24/2014 1:00 PM | 1:59 PM | 1 hour | Maintenance - Stack Flow | Replaced Stack Flow Regulator. Made Adjustments on Regulator and Needle Valve. |
| Total duration | | | 33 hours | | |

Comment: Form D - Downtime Summary

Data Sheet for Crude Charge Heater CEM System Cylinder Gas Audit

1. Date Audit Commenced: 6/4/2014 Time Audit Commenced: 9:45 AM

2. Audit Gases Used for CGA (All gases to be Protocol 1 Certified):

| Acceptable Audit Gas Ranges | Cylinder Number and Expiration Date | Audit Gas Concentrations | | +/- of Audit Gas Range |
|-------------------------------------|-------------------------------------|--------------------------|-----|------------------------|
| NOx Low: 20 - 30 ppm | CC90737 | 26.20 | ppm | 26.20% |
| | 26-Mar-22 | | | |
| NOx Mid: 50 - 60 ppm | CC143970 | 55.67 | ppm | 55.67% |
| | 2-Apr-22 | | | |
| O2 Low: 4.18 - 6.27% by volume | EB0042977 | 4.99 | % | 23.88% |
| | 23-Mar-22 | | | |
| O2 Mid: 10.45 - 12.54% by volume | CC189312 | 10.01 | % | 47.89% |
| | 23-Mar-22 | | | |

3. CEM System Response:

| | Low-Span NO _x | | Mid-Span NO _x | | Low-Span O ₂ | | Mid-Span O ₂ | |
|------------------------|--------------------------|---------|--------------------------|---------|-------------------------|-------|-------------------------|-------|
| | Analyzer | CISCO | Analyzer | CISCO | Analyzer | CISCO | Analyzer | CISCO |
| Run 1 | 25.33 | 25.33 | 55.38 | 55.38 | 5.00 | 5.01 | 9.98 | 9.98 |
| Run 2 | 25.28 | 25.28 | 55.47 | 55.47 | 5.00 | 5.00 | 9.99 | 9.99 |
| Run 3 | 25.33 | 25.33 | 55.48 | 55.48 | 5.01 | 5.01 | 9.99 | 9.99 |
| Avg. (d _m) | 25.31 | #DIV/0! | 55.44 | #DIV/0! | 5.01 | 5.01 | 9.99 | 9.99 |
| A | 3.39 | #DIV/0! | 0.41 | #DIV/0! | 0.32 | 0.33 | 0.24 | 0.23 |
| Pass? | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |

4. Signature of Technician(s) performing CGA: 

Calculation of A:

$$A = (d_m - c_a) / c_a \times 100$$

A must be +/-15% to pass.

where:

A = accuracy of CEM

d_m = average of responses

c_a = certified audit value of gas



A DIVISION OF NORCO, INC.

Calibration Gases & Equipment

EPA Protocol Standard Gas Mixture

To:
Norco, Inc
Cheyenne Warehouse
100 S. Greeley HWY
Cheyenne, WY 82007

Report of Analysis and Certification

Manufactured at/by:

EPA Protocol Vendor ID P12014

NorLab Order # 34175499
Customer PO# N/A
Part Number SPG 5E166025PN
Lot Number: 4-072-522
Cylinder Number CC90737

Date Certified: 03/27/14
Cylinder Pressure: 2000 psig @ 70 F
Expiration Date: 03/26/22

| Component(s) | Conc V/V | ± EPA Uncertainty | Analyzer1 NO, Nox | MTO 60a FTIR | | | |
|-------------------|----------|-------------------|-------------------|---------------|-----------|-----------|-------|
| Nitric Oxide, ppm | 26.15 | 0.174 | Calibrated: | Assay 1; 2; 3 | 3/21/2014 | 3/21/2014 | |
| Total Nox, ppm | 26.20 | | Analyzer 2 | #REF! | | | |
| | | | Calibrated: | Assay 1; 2; 3 | | #REF! | #REF! |
| Nitrogen, O2 Free | Balance | | | | | | |

| Reference Standard Data | | | | | | |
|-------------------------|--------------------------|------------|------------|---------|-------|------|
| Component | Lot# and XP Date (MM/YY) | ID | Cyl# | Sam# | Conc. | U |
| Nitric Oxide | 2-094-170 XP 8x16 | GMIS 2628a | CC 138737 | na | 25.01 | 0.16 |
| Traceable Std 17 GMIS | 8-023-600 XP 2x14 | SRM 2628a | CAL 018488 | 48-H-84 | 9.89 | 0.11 |

| Replicate Analysis Data | | | | | | | |
|-------------------------|--|-----------|--|---------|--|--|--|
| Assay 1 | | Assay 2 | | Assay 3 | | | |
| NO | | NO | | | | | |
| 3/21/2014 | | 3/27/2014 | | | | | |
| 26.05 | | 26.08 | | | | | |
| 26.11 | | 26.17 | | | | | |
| 26.22 | | 26.19 | | | | | |
| 26.18 | | 26.20 | | | | | |
| 26.14 | | 26.21 | | | | | |
| 26.06 | | 26.18 | | | | | |
| 26.13 | | 26.17 | | | | | |

The analysis listed in this report was performed in accordance with the Procedure G1 of the EPA Traceability Protocol, EPA 600/R-12/531 May 2012.

The contents of this cylinder must not be used if the pressure is less than 100 psig.

Analyst: 
Aaron Schwenken, Lab Technician

Approved: 
Charles Eckman, Quality Assurance Unit



A DIVISION OF NORCO, INC.

Calibration Gases & Equipment

EPA Protocol Standard Gas Mixture

To:
Norco, Inc
Cheyenne Warehouse
100 S. Greeley HWY
Cheyenne, WY 82007

Report of Analysis and Certification

Manufactured at/by:
EPA Protocol Vendor ID P12014

NorLab Order # 34175499
Customer PO# N/A
Part Number SPG 5E166055PN
Lot Number: 4-072-521
Cylinder Number CCI43970

Date Certified: 04/03/14
Cylinder Pressure: 2000 psig @ 70 F
Expiration Date: 04/02/22

| Component(s) | Conc. V/V | ± EPA Uncertainty | Analyzer1 NO, Nox | MTO 60a FTIR | | |
|-------------------|-----------|-------------------|-------------------|---------------|-----------|-----------|
| Nitric Oxide, ppm | 55.15 | 0.37 | Calibrated: | Assay 1: 2, 3 | 3/18/2014 | 3/18/2014 |
| Total Nox, ppm | 55.67 | | Analyzer 2 | #REF! | | |
| | | | Calibrated: | Assay 1: 2, 3 | #REF! | #REF! |
| Nitrogen, O2 Free | Balance | | | | | |

Reference Standard Data

| Component | Lot# and XP Date (MM/YR) | ID | Cyl# | Sam# | Conc. | U |
|----------------------|--------------------------|------------|------------|---------|-------|------|
| Nitric Oxide | 3-084-171 XP 6x16 | GMIS 1684b | CC 127610 | na | 60.68 | 0.21 |
| Traceable Std # GMIS | 1-082-600 XP 6x16 | SRM1684b | CAL 015080 | 44-8-92 | 67.45 | 0.41 |


Replicate Analysis Data

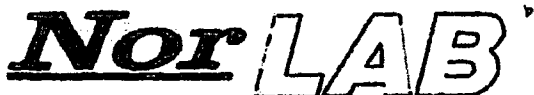
| Assay 1 | | Assay 2 | | Assay 3 | |
|-----------|--|----------|--|---------|--|
| NO | | NO | | | |
| 3/20/2014 | | 4/2/2014 | | | |
| 55.15 | | 55.19 | | | |
| 55.25 | | 55.10 | | | |
| 55.16 | | 55.06 | | | |
| 55.15 | | 55.12 | | | |
| | | | | | |
| | | | | | |
| 55.18 | | 55.12 | | | |

The analysis listed in this report was performed in accordance with the Procedure G1 of the EPA Traceability Protocol, EPA 600/R-12/531 May 2012.

The contents of this cylinder must not be used if the pressure is less than 100 psig.

Analyst: 
Aaron Schwenken, Lab Technician

Approved: 
Charles Eckman, Quality Assurance Unit



A DIVISION OF NORCO INC

Calibration Gases & Equipment

EPA Protocol Standard Gas Mixture

Report of Analysis and Certification

Manufactured at/by:
EPA Protocol Vendor ID P12013

To:
Norco Inc.
Cheyenne Whse.
100 S. Greeley Hwy.
Cheyenne, WY. 341

NorLab Order # 34175499 Date Certified: 03/24/14
Customer PO# na Cylinder Pressure: 2000 psig @ 70 F
Part Number SPG 5E10725VN
Lot Number: 4-072-524
Cylinder Number EB0042977 Expiration Date: 03/23/22

| Component(s) | Conc. V/V | ± RPA Uncertainty | Analyzer1 (O2) | Servomex Paramagnetic Analyzer MTO 97A | | |
|-------------------|-----------|----------------------|-------------------|--|-----------|--|
| Oxygen, % | 4.999 | 0.029 | Calibrated | Assay 1, 2, 3 | 3/24/2014 | |
| Nitrogen, O2 Free | Balance | | | | | |

| Reference Standard Data | | | | | | |
|-------------------------|----------------------|------------|------------|---------|-------|-------|
| Component | # and XP Date (MM/Y) | ID | Cy# | Sam# | Conc. | U |
| Oxygen, % | 3-079-181 XP 8X18 | GMIS 2858A | CC 53742 | | 9.913 | 0.043 |
| Traceable Std if GMIS | 0-130-600 6x17 | SRM 2858a | CAL 018948 | 72-D-46 | 9.918 | 0.022 |

| Replicate Analysis Data | | | | | | |
|-------------------------|--|-----------|--|-----------|--|--|
| Assay 1 | | Assay 2 | | Assay 3 | | |
| Oxygen, % | | Oxygen, % | | Oxygen, % | | |
| 3/24/2014 | | | | | | |
| 4.98 | | | | | | |
| 5.00 | | | | | | |
| 5.01 | | | | | | |
| 5.00 | | | | | | |
| 0.00 | | | | | | |
| 0.00 | | | | | | |
| 5.00 | | | | | | |

The analysis listed in this report was performed in accordance with the Procedure G1 of the EPA-4 Traceability Protocol, EPA 600/R-12/531 May 2012.

The contents of this cylinder must not be used if the pressure is less than 100 psig.

Analyst:

Jeff Koch, Lab Technician

Approved:

Charles Eckman, Quality Assurance Unit



A DIVISION OF NORCO, INC

Calibration Gases & Equipment

EPA Protocol Standard Gas Mixture

Report of Analysis and Certification

Manufactured at/by:

EPA Protocol Vendor ID P12013

To:

Norco Inc.

Cheyenne Whse.

100 S. Greeley Hwy.

Cheyenne, WY. 341

NorLab Order # 34175499

Date Certified: 03/24/14

Customer PO# na

Cylinder Pressure: 2000 psig @ 70 F

Part Number SPQ 5E107210VN

Lot Number: 4-072-523

Cylinder Number CC 189312

Expiration Date: 03/23/22

| Component(s) | Conc. V/V | ± HPA Uncertainty | Analyzer1 (O2) | Servomex Paramagnetic Analyzer MT1 97A | | |
|-------------------|-----------|-------------------|----------------|--|-----------|--|
| Oxygen, % | 10.01 | 0.047 | Calibrated: | Assay 1, 2, 3 | 3/24/2014 | |
| Nitrogen, O2 Free | Balance | | | | | |

| Reference Standard Data | | | | | | |
|-------------------------|-----------------------|------------|------------|---------|-------|-------|
| Component | # and XP Date (MM/YY) | ID | Cyl# | Sam# | Conc. | U |
| Oxygen, % | 3-078-181 XP 6X18 | GMIS 2858A | CC 53742 | | 9.913 | 0.043 |
| Traceable Std if GMIS | 0-130-800 6x17 | SRM 2658a | CAL 018946 | 72-D-46 | 9.918 | 0.022 |

| Replicate Analysis Data | | | | | | |
|-------------------------|--|-----------|--|-----------|--|--|
| Assay 1 | | Assay 2 | | Assay 3 | | |
| Oxygen, % | | Oxygen, % | | Oxygen, % | | |
| 3/24/2014 | | | | | | |
| 10.00 | | | | | | |
| 10.02 | | | | | | |
| 10.01 | | | | | | |
| 10.01 | | | | | | |
| 0.00 | | | | | | |
| 0.00 | | | | | | |
| 10.01 | | | | | | |

The analysis listed in this report was performed in accordance with the Procedure G1 of the EPA Traceability Protocol, EPA 600/R-12/531 May 2012.

The contents of this cylinder must not be used if the pressure is less than 100 psig.

Analyst:

Jeff Kopp, Lab Technician

Approved:

Charles Eckman, Quality Assurance Unit

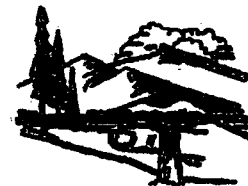
Page 1 of 1

4-072-523 CHE 34175499



Department of Environmental Quality

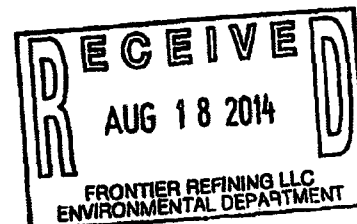
*To protect, conserve and enhance the quality of Wyoming's
environment for the benefit of current and future generations.*



Matthew H. Mead, Governor

Todd Parfitt, Director

August 13, 2014



Mr. David Weeks
Environmental Engineer
Frontier Refining, LLC
P.O. Box 1588
Cheyenne, WY 82003-1588

Re: 2014 Frontier Refining Crude Charge Heater CEMS Certification Report.

Dear Mr. Weeks:

The Wyoming Department of Environmental Quality, Air Quality Division (Division) has completed its review of the continuous emission monitoring system (CEMS) certification reports submitted by Frontier Refining, LLC (Frontier) on the crude charger heater outlet stack. Frontier conducted the CEMS certification testing at the Cheyenne plant located near Cheyenne, Wyoming during the week of March 4, 2014. Testing performed was to determine exhaust gas flow rates, concentrations, and mass emission rate of nitrogen oxides (NOx) and oxygen (O₂).

Air Pollution Testing compared the reference method testing results with the results from the Frontier facility's CEMS to decide the relative accuracy. I am happy to inform Frontier that the Division recognizes that the CEMS cited above, based on the RATA reports submitted, has demonstrated compliance with the CEMS performance specification outlined in 40 CFR 60.

If you have any questions, please feel free to contact me at (307) 777-7351.

Sincerely,

Mark Gagen

CEMS Coordinator

Enclosure (1)

cc: Glenn Spangler, DEQ District Engineer
CEMS

File



Summary of Frontier Refining Crude Charge Heater

| Parameter | Units | RM Value | CEMS Value | %RA Reported | %RA Reviewed | % RA Limit |
|-----------|-----------|----------|------------|--------------|--------------|------------|
| Nox ppm | ppm | 21.6 | 17.3 | 19.95 | 19.88 | 20.0 |
| Nox | lbs/mmBtu | 0.027 | 0.022 | 19.08 | 19.19 | 20.0 |
| O2 | % | 4.1 | 4.0 | 0.08 | 0.08 | 1.0 |

Compliance

| Paramter | Units | Reported RM Value | Reviewed RM Value | Permit Limit |
|----------|----------|-------------------|-------------------|--------------|
| Nox | ppm | 21.6 | 21.6 | N/A |
| Nox | lb/hr | 4.7 | 4.7 | 6.3 |
| Nox | lb/mmBtu | 0.027 | 0.027 | 0.031 |

Section E – LDAR

LDAR Corrective Action Plan

Frontier Refining LLC
P.O. Box 1588 • Cheyenne, WY 82003-1588

Report Period January 1 – July 31, 2014

| Paragraph | Attachment E - LDAR | Comments |
|-----------|---|--|
| 216e | Any additional items required by any other Paragraph of this Consent Decree to be submitted with a semi-annual report including but not limited to reports required under Paragraphs 137, 152, 170, and 205. | See Below |
| 152 | Implementation of Actions Necessary to Correct Non-Compliance. If the results of any of the audits conducted pursuant to Paragraphs 147 - 150 identify any areas of non-compliance, FRI and FEDRC, as applicable, shall implement all steps necessary to correct the area(s) of non-compliance as soon as possible and to prevent a recurrence of the cause of the non-compliance. For purposes of this Paragraph, a ratio of the process unit valve leak percentage established through a comparative monitoring audit conducted under Paragraphs 147 through 150 to determine the average valve leak percentage reported for the process unit for the four quarters immediately preceding the audit in excess of 3.0 shall be cause for corrective action and shall be subject to stipulated penalties as provided in Paragraph 294. If the calculated ratio yields an infinite result, FRI and FEDRC shall assume 1 leaking valve was found during the 4-quarter period and shall recalculate the ratio. Until two years after termination of this Consent Decree FRI and FEDRC shall retain the audit reports generated pursuant to Paragraphs 147 through 150 and shall maintain a written record of the corrective actions taken at each of the Covered Refineries in response to any deficiencies identified in any audits. In the semi-annual report submitted pursuant to the provisions of Paragraph 216 of this Consent Decree (Reporting and Record Keeping) for the first calendar half of each year, FRI and FEDRC shall submit the audit reports and corrective action records for audits performed and actions taken during the previous calendar year. | A Consent Decree required LDAR audit was conducted in August of 2011. The next audit was completed in August of 2013. The final report and the summary of the corrective actions taken was included in the 2nd half 2013 semi-annual report. |
| 170 | Record Keeping and Reporting. Consistent with the requirements of Section XI. (Reporting and Record Keeping), FRI and FEDRC shall maintain records to demonstrate compliance with the requirements of Section VI.M. of this Consent Decree, and shall include the information set forth below in the designated semi-annual progress report(s): | See Below |
| 170a | First Semi-Annual Progress Report Due under this Consent Decree. At the later of the first semi-annual progress report due under this Consent Decree, or the first semi-annual progress report in which the requirement becomes due, for their respective Covered Refinery, FRI and FEDRC shall include the following: | See Below |
| 170a.i | Copies of the written Refinery-wide LDAR Program required by Paragraph 144; | Initial plan submitted Feb. 26, 2010. |
| 170a.ii | A certification of the implementation of the lower leak definitions and monitoring frequencies in Paragraphs 153, 154, 155, 158, and 159; | Certification submitted Aug. 31, 2009. |
| 170a.iii | A certification of the implementation of the "initial attempt at repair" or "optical imaging" program of Paragraphs 156 and 157; | Certification submitted Apr. 15, 2009. |
| 170a.iv | A certification of the implementation of QA/QC procedures for review of data generated by LDAR technicians as required by Paragraph 162; | Certification submitted Aug. 31, 2009. |
| 170a.v | An Identification of the individual at each of the Covered Refineries responsible for LDAR performance as required by Paragraph 144. g.; | Certification submitted Aug. 31, 2009. |

| Paragraph | Attachment E - LDAR | Comments |
|-----------|---|--|
| 170a.vi | A certification of the development of a tracking program for new valves and pumps added during maintenance and construction as required by Paragraph 164; | Certification submitted Aug. 31, 2009. |
| 170a.vii | A certification of the implementation of the calibration drift assessment procedures of Paragraph 166; | Certification submitted Aug. 31, 2009. |
| 170a.viii | A certification of the implementation of the "delay of repair" procedures of Paragraph 167; and | Certification submitted Aug. 31, 2009. |
| 170a.ix | report of the implementation of the "chronic leaker" program of Paragraph 169. | Report submitted on Feb. 26, 2010. |
| 170b | b. Semi-Annual Progress Report for the First Calendar Half of Each Year. In the semi-annual progress report that FRI and FEDRC submit pursuant to Section XI. (Reporting and Record Keeping) for the first calendar half of each year, they shall include an identification of each audit that was conducted pursuant to the requirements of Paragraphs 147 - 150 in the previous calendar year including an identification of the auditors, a summary of the audit results, and a summary of the actions that each took or intends to take to correct all deficiencies identified in the audits. | A Consent Decree required LDAR audit was conducted in August of 2011. The next audit was completed in August of 2013. The final report and the summary of the corrective actions taken was included in the 2nd half 2013 semi-annual report. |

Section F – SEP

Frontier Refining LLC
P.O. Box 1588 • Cheyenne, WY 82003-1588

Report Period January 1 – July 31, 2014

| Paragraph | Attachment F - Supplemental Environmental Projects/Environmentally Beneficial Projects | Comments |
|-----------|--|--|
| 216c | A description of all Supplemental Environmental Projects and Implementation activity in accordance with this Consent Decree; | Per paragraph 189, geodesic domes were installed on tanks TK 2-70 and TK 2-71. The project was completed on Feb. 18, 2010. |
| 216e | Any additional items required by any other Paragraph of this Consent Decree to be submitted with a semi-annual report including but not limited to reports required under Paragraphs 137, 152, 170, and 205. | See below. |
| 205 | FRI and FEDRC shall include in each Report required by Paragraph 216 of this Consent Decree a progress report for each SEP being performed under Paragraphs 188 through 199 of this Consent Decree. In addition to the information required by Paragraph 216 of this Consent Decree, for the reporting period in which any SEP identified in Paragraphs 188 through 199 of this Consent Decree is completed, the following information with respect to each completed SEP shall be included in the report required by Paragraph 216: | See below. |
| 205a | A report containing a detailed description of the SEP as implemented; | Per paragraph 189, geodesic domes were installed on tanks TK 2-70 and TK 2-71. The project was completed on Feb. 18, 2010. |
| 205b | A brief description of any significant operating problems encountered, including any that had an impact on the environment, and the solutions for each problem; | N/A - Work completed. |
| 205c | Certification, in the form required by Paragraph 219 of this Consent Decree, that the SEP has been fully implemented pursuant to the provisions of this Consent Decree together with a statement of the total SEP cost upon completion; and | Certification previously submitted Aug. 31, 2010. |
| 205d | A description of the environmental and public health benefits resulting from implementation of each project (including quantification of the benefits and pollutant reductions, if feasible). | Per paragraph 189, installation of the geodesic domes resulted in an expected reduction of 49,490 pounds per year. |

Section G – SRP

CEMS Data

Frontier Refining LLC
P.O. Box 1588 • Cheyenne, WY 82003-1588

Report Period January 1 – July 31, 2014

| Paragraph | Attachment G - SRPs | Comments |
|-----------|--|---|
| 217d | SO2 emissions from all Sulfur Recovery Plants in tons per year; | Emissions information contained in this section. |
| 217h | for each of the estimates or calculations in Subparagraphs 217.a. through 217.g. above, the basis for the emissions estimate or calculation (i.e. stack tests, CEMS, emission factor, etc.). | Basis for the emission estimate or calculation is included with the emission information. |
| 218a | for operating units emissions limits that are required by this Consent Decree and monitored with CEMS, for each CEMS: | CEM monitoring data is included in this section. |

1Q14

DEPARTMENT OF ENVIRONMENTAL QUALITY
AIR QUALITY DIVISION
CONTINUOUS EMISSION MONITORING REPORT

FORM A

I. GENERAL INFORMATION

- A. Facility Name: FRONTIER REFINING LLC
- B. Process Unit/Pollutant Monitored: SO₂ MONITOR - NO. 1 AND NO. 2 SULFUR RECOVERY UNITS (COMMON STACK)
- C. Applicable Permit Number or Regulation: NSPS Subpart J, CT-84A2, MD-188, MD-1115A
- D. Applicable Emission Limit: 250 ppmvd @ 0% O₂ (12-hr rolling average); 18.6 lb/hr (1-hr average)

II. MONITOR INFORMATION

- A. Date of Original Monitor Installation: June 28, 2000
- B. Date of Latest Monitor Certification: August 21, 2000
- C. Pollutant/Opacity Monitor
 - 1. Manufacturer: Brimstone Instrumentation LTD.
 - 2. Model Number: BRM 991-CEM
 - 3. Serial Number Main Chassis: CEM-00002-00003
 - 4. Basis of Measurement (If Applicable - Wet or Dry): Wet
 - 5. Instrument Span, Range Value (Specify Units): 0 - 500 ppm SO₂
- D. Diluent Monitor
 - 1. Type of Monitor: O₂
 - 2. Manufacturer: AMETEK Process & Analytical Division
 - 3. Model Number: Series 2000
 - 4. Serial Number Main Chassis: 10202890
 - 5. Basis of Measurement (If Applicable - Wet or Dry): Wet
 - 6. Instrument Span, Range Value (Specify Units): 0 - 25 percent (%)
- E. Flow Monitor
 - 1. Type of Instrument (i.e. S-type Pitot Tube): Pitot Tube
 - 2. Manufacturer: _____
 - 3. Model Number: _____
 - 4. Serial Number Main Chassis: _____
- F. Quality Assurance Data
 - 1. QA Plan Date: January 7, 2013
 - 2. QA Plan Approval Date: August 29, 2013

III. Operating/Monitoring Data

A. Quarter: 1 Year: 2014

B Total Hours in Reporting Period: 2160

C. Hours Unit Operated During the Reporting Period: 2160 (Hours with one or both SRU's operating)

Note: Include all unit operating time for the quarter including operating time associated with Startup/Shutdown and Chapter 1 Section 5 (Emergency/Abnormal) Operations. Report time in hours to one decimal place, i.e. 1902.8.

IV. Quarterly Audits/Monitoring System Modifications

A. Quarterly Audits

Type Audit: CGA

| | <u>Date Conducted</u> | <u>Pass</u> |
|----------------------------|-----------------------|-------------|
| Pollutant/Opacity Monitor: | <u>3/26/2014</u> | <u>Yes</u> |
| Diluent Monitor | <u>3/26/2014</u> | <u>Yes</u> |

Note: A copy of the quarterly audits shall be included with the corresponding quarterly excess emission report.

B. Equipment Replaced During Reporting Period: Changed filters and steel wool; Changed SO₂ Span Calibration Bottle; Replaced Sample Line; Changed Probe; Replaced WTC DAS to CISCO CeDAR5.

Note: Only equipment replacements or modifications to the system that could affect the ability of the continuous monitoring system to comply with the associated Performance Specification shall be reported.

V. Report Contact

A. Name: David Weeks, Environmental Engineer

B. Phone Number: (307) 771-8827

1Q14

EXCESS EMISSION SUMMARY REPORT**Incinerator SO₂ (ppm) CEMS****12-hr rolling average = 250 ppm @ 0 % O₂****FORM B**

| Emission Data Summary (12-hour average ppm) | | CMS Performance Report | |
|--|-------------|---|--------------|
| I. Duration of Excess Emission in Reporting Period Due to: | | I. CMS Downtime in Reporting Period Due to: | |
| A. Startup/Shutdown | 0.0 | A. Monitor Equipment Malfunction | 491.0 |
| B. Control Equipment Problems | 0.0 | B. Non-Monitor Equipment Malfunctions | 60.0 |
| C. Process Problem | 28.0 | C. Quality Assurance Calibration | 0.0 |
| D. Other Known Causes | 0.0 | D. Other Known Causes | 13.0 |
| E. Unknown Causes | 0.0 | E. Unknown Causes | 0.0 |
| II. Total Duration of Excess Emission | 28.0 | II. Total CMS Downtime | 564.0 |
| III. Total Duration of Excess Emissions x 100 divided by Total Source Operating Time minus Total CMS Downtime | 1.7% | III. Total CMS Downtime x 100 divided by Total Source Operating Time | 26.1% |

Total time of excess emission events due to emergency/abnormal operations: 0.**NOTE:**

1. Only report excess emissions which occur when the unit/process is operating. Include all excess emissions in the Emission Data Summary including those excess emissions associated with startup/shutdown and those excess emissions associated with Chapter 1 Section 5 (Emergency/Abnormal) operations. Report times in hours for gaseous monitors and in tenths of an hour for opacity monitors. Include detailed excess emission information and causes in the Excess Emission Table (Form C).
2. Only report CEM downtime which occurs while the unit/process is operating. Report time in hours to one decimal point. Include detailed CEM downtime and causes in the Monitor Outage Table (Form D).
3. Include an explanation of what corrective actions were taken for total excess emissions or monitor downtime for the quarter (Emission Data Summary and CMS Performance Summary, Item III) greater than 5%. (See Instructions for further details.)

1Q14 TGTU Incinerator CEMS
Form C - Excess Emissions Summary

Incinerator SO2 ppm (12-Hour)

| No. | Start Time | End Time | Max | Periods | Reason | Action |
|---------------------------------------|----------------------|----------------------|------------|----------------|------------------------------------|--|
| 1 | 2/17/2014 6:00:00 AM | 2/17/2014 3:00:00 PM | 312.5 | 9 | SRU #2 shut down | Restarted unit |
| 2 | 3/4/2014 2:00:00 AM | 3/4/2014 4:00:00 AM | 254.1 | 2 | Process Upset - DHDS Rate Increase | Adjusted Unit Rates to Bring into Compliance |
| 3 | 3/4/2014 9:00:00 PM | 3/5/2014 2:00:00 PM | 421.5 | 17 | Process Upset - DHDS Rate Increase | Adjusted Unit Rates to Bring into Compliance |
| Total Periods Excess Emissions | | | | 28 | | |

TGTU Incinerator Excess Emissions Summary

Frontier Refining LLC

SO2 ppm (dry) @0% O2 12-Hr Rolling Excess Emissions for 3/26/2014 thru 3/31/2014

| Reason | Duration |
|---|-----------|
| <i>There are no excess emissions for this report.</i> | |
| Total duration of SO2 ppm (dry) @0% O2 12-Hr Rolling excess emissions | 0 |
| Total operating time | 144 hours |
| Operating time with excess emissions | 0.0% |

Comment: Data Acquisition System (DAS) Conversion from WTC to CISCO CeDARS on 26-Mar-14

1Q14 TGTU Incinerator CEMS

Form D - Monitor Downtime Summary

Incinerator SO2 ppm (1-Hour)

| No. | Start Time | End Time | Hours | Reason | Action |
|-----|-----------------------|-----------------------|-------|---|--|
| 1 | 1/5/2014 4:00:00 AM | 1/8/2014 10:00:00 AM | 30 | Failed daily CD check (excessive drift) | Ran Manual Calibration |
| 2 | 1/8/2014 4:00:00 AM | 1/8/2014 6:00:00 AM | 2 | Sample system failure | Cleaned Sample Cell |
| 3 | 1/8/2014 10:00:00 AM | 1/8/2014 11:00:00 AM | 1 | Sample system failure | Cleaned Sample Cell |
| 4 | 1/8/2014 10:00:00 PM | 1/8/2014 11:00:00 PM | 1 | Sample system failure | Replaced Sample Line |
| 5 | 1/9/2014 9:00:00 AM | 1/9/2014 1:00:00 PM | 4 | Sample system failure | Replaced Sample Line |
| 6 | 1/10/2014 8:00:00 AM | 1/10/2014 10:00:00 AM | 2 | Sample system failure | Cleared probe and sample line, changed filters and steel wool. Ran Manual Cal. |
| 7 | 1/11/2014 4:00:00 AM | 1/11/2014 6:00:00 AM | 2 | Sample system failure | Cleared probe and sample line, changed filters and steel wool. Ran Manual Cal. |
| 8 | 1/13/2014 12:00:00 PM | 1/13/2014 3:00:00 PM | 3 | Sample system failure | Cleared probe and sample line, changed filters and steel wool. Ran Manual Cal. |
| 9 | 1/14/2014 10:00:00 AM | 1/14/2014 11:00:00 AM | 1 | Sample system failure | Leak Checked Sample Line - Replaced Sample Line |
| 10 | 1/20/2014 10:00:00 AM | 1/20/2014 11:00:00 AM | 1 | Sample system failure | Cleared probe and sample line, changed filters and steel wool. Ran Manual Cal. |
| 11 | 1/21/2014 1:00:00 AM | 1/21/2014 2:00:00 AM | 1 | Sample system failure | Cleared probe and sample line, changed filters and steel wool. Ran Manual Cal. |
| 12 | 1/22/2014 8:00:00 AM | 1/22/2014 1:00:00 PM | 5 | Sample system failure | Cleared probe and sample line, changed filters and steel wool. Ran Manual Cal. |
| 13 | 1/22/2014 6:00:00 PM | 1/22/2014 8:00:00 PM | 2 | Sample system failure | Cleared probe and sample line, changed filters and steel wool. Ran Manual Cal. |
| 14 | 1/22/2014 9:00:00 PM | 1/22/2014 10:00:00 PM | 1 | Sample system failure | Cleared probe and sample line, changed filters and steel wool. Ran Manual Cal. |
| 15 | 1/23/2014 3:00:00 AM | 1/23/2014 7:00:00 AM | 4 | Sample system failure | Cleared probe and sample line, changed filters and steel wool. Ran Manual Cal. |
| 16 | 1/23/2014 10:00:00 AM | 1/23/2014 1:00:00 PM | 3 | Sample system failure | Cleared probe and sample line, changed filters and steel wool. Ran Manual Cal. |
| 17 | 1/23/2014 9:00:00 PM | 1/25/2014 4:00:00 AM | 31 | SO2 Analyzer Issues - Appears to be Amine Contamination | Worked on Analyzer - Installed a Parallel SO2 Analyzer |

1Q14 TGTU Incinerator CEMS

Form D - Monitor Downtime Summary

Incinerator SO2 ppm (1-Hour)

| No. | Start Time | End Time | Hours | Reason | Action |
|-----|----------------------|-----------------------|-------|---|--|
| 18 | 1/28/2014 4:00:00 AM | 1/28/2014 6:00:00 AM | 2 | SO2 Analyzer Issues - Appears to be Amine Contamination | Worked on Analyzer - Installed a Parallel SO2 Analyzer |
| 19 | 1/28/2014 8:00:00 AM | 1/28/2014 10:00:00 AM | 2 | SO2 Analyzer Issues - Appears to be Amine Contamination | Worked on Analyzer - Installed a Parallel SO2 Analyzer |
| 20 | 1/28/2014 1:00:00 PM | 1/28/2014 5:00:00 PM | 4 | SO2 Analyzer Issues - Appears to be Amine Contamination | Worked on Analyzer - Installed a Parallel SO2 Analyzer |
| 21 | 1/29/2014 4:00:00 AM | 1/29/2014 2:00:00 PM | 10 | SO2 Analyzer Issues - Appears to be Amine Contamination | Worked on Analyzer - Installed a Parallel SO2 Analyzer |
| 22 | 1/30/2014 2:00:00 AM | 1/30/2014 3:00:00 AM | 1 | SO2 Analyzer Issues - Appears to be Amine Contamination | Worked on Analyzer - Installed a Parallel SO2 Analyzer |
| 23 | 1/30/2014 5:00:00 AM | 1/30/2014 6:00:00 AM | 1 | SO2 Analyzer Issues - Appears to be Amine Contamination | Worked on Analyzer - Installed a Parallel SO2 Analyzer |
| 24 | 1/31/2014 4:00:00 PM | 1/31/2014 6:00:00 PM | 2 | SO2 Analyzer Issues - Appears to be Amine Contamination | Worked on Analyzer - Installed a Parallel SO2 Analyzer |
| 25 | 1/31/2014 9:00:00 PM | 1/31/2014 10:00:00 PM | 1 | SO2 Analyzer Issues - Appears to be Amine Contamination | Worked on Analyzer - Installed a Parallel SO2 Analyzer |
| 26 | 2/1/2014 | 2/1/2014 2:00:00 AM | 2 | SO2 Analyzer Issues - Appears to be Amine Contamination | Worked on Analyzer - Installed a Parallel SO2 Analyzer |
| 27 | 2/1/2014 4:00:00 AM | 2/4/2014 4:00:00 AM | 72 | Failed daily CD check (excessive drift) | Passed Morning Cal |
| 28 | 2/5/2014 4:00:00 AM | 2/12/2014 2:00:00 PM | 178 | Failed daily CD check (excessive drift) | OEM Service Technician Troubleshooting |
| 29 | 2/13/2014 4:00:00 AM | 2/13/2014 10:00:00 AM | 6 | Failed daily CD check (excessive drift) | Ran Manual Calibration |
| 30 | 2/13/2014 6:00:00 PM | 2/14/2014 2:00:00 PM | 20 | SO2 Analyzer Issues | Cleared probe and sample line, changed filters and steel wool. Ran Manual Cal. |
| 31 | 2/25/2014 4:00:00 AM | 2/25/2014 9:00:00 AM | 5 | Failed daily CD check (excessive drift) | Ran Manual Calibration |
| 32 | 2/27/2014 2:00:00 AM | 2/27/2014 3:00:00 AM | 1 | SO2 Analyzer Issues | Worked on Analyzer - Pulling Draegers every Hour |
| 33 | 2/27/2014 5:00:00 AM | 2/27/2014 6:00:00 PM | 13 | SO2 Analyzer Issues | Worked on Analyzer - Pulling Draegers every Hour |
| 34 | 2/27/2014 7:00:00 PM | 2/27/2014 9:00:00 PM | 2 | SO2 Analyzer Issues | Worked on Analyzer - Pulling Draegers every Hour |

1Q14 TGTU Incinerator CEMS

Form D - Monitor Downtime Summary

Incinerator SO2 ppm (1-Hour)

| No. | Start Time | End Time | Hours | Reason | Action |
|--|-----------------------|-----------------------|------------|--|--|
| 35 | 2/27/2014 10:00:00 PM | 3/1/2014 6:00:00 PM | 44 | SO2 Analyzer Issues | Worked on Analyzer - Pulling Draegers every Hour |
| 36 | 3/2/2014 1:00:00 AM | 3/2/2014 2:00:00 AM | 1 | SO2 Analyzer Issues | Worked on Analyzer - Pulling Draegers every Hour |
| 37 | 3/2/2014 3:00:00 AM | 3/2/2014 5:00:00 AM | 2 | SO2 Analyzer Issues | Worked on Analyzer - Pulling Draegers every Hour |
| 38 | 3/2/2014 10:00:00 AM | 3/2/2014 6:00:00 PM | 8 | SO2 Analyzer Issues | Worked on Analyzer - Pulling Draegers every Hour |
| 39 | 3/2/2014 8:00:00 PM | 3/3/2014 1:00:00 PM | 17 | SO2 Analyzer Issues | Worked on Analyzer - Pulling Draegers every Hour |
| 40 | 3/14/2014 11:00:00 AM | 3/14/2014 12:00:00 PM | 1 | Sulfur Unit problems caused high SO2, knocking CEMS out of calibration | Cleared probe and sample line, changed filters and steel wool. Ran Manual Cal. |
| 41 | 3/14/2014 9:00:00 PM | 3/14/2014 10:00:00 PM | 1 | Sulfur Unit problems caused high SO2, knocking CEMS out of calibration | Cleared probe and sample line, changed filters and steel wool. Ran Manual Cal. |
| 42 | 3/14/2014 11:00:00 PM | 3/15/2014 1:00:00 AM | 2 | Sulfur Unit problems caused high SO2, knocking CEMS out of calibration | Cleared probe and sample line, changed filters and steel wool. Ran Manual Cal. |
| 43 | 3/15/2014 4:00:00 AM | 3/17/2014 4:00:00 AM | 48 | Failed daily CD check (excessive drift) | Cleared probe and sample line, changed filters and steel wool. Ran Manual Cal. |
| 44 | 3/17/2014 11:00:00 PM | 3/18/2014 | 1 | SO2 Analyzer Issues | No Action Taken - Self Corrected |
| 45 | 3/22/2014 5:00:00 AM | 3/22/2014 8:00:00 AM | 3 | SO2 Analyzer Issues | Cleared Probe, changed Filters and Steel Wool |
| 46 | 3/22/2014 9:00:00 AM | 3/22/2014 3:00:00 PM | 6 | SO2 Analyzer Issues | Cleared Probe, changed Filters and Steel Wool |
| 47 | 3/25/2014 2:00:00 PM | 3/25/2014 3:00:00 PM | 1 | SO2 Analyzer Issues | No Action Taken - Self Corrected |
| Total Hours Monitor Unavailable | | | 551 | | |

TGTU Incinerator CEMS Downtime Summary

Frontier Refining LLC

SO2 ppm CEMS Downtime for 3/26/2014 thru 3/31/2014

| Reason | Duration |
|--|------------------|
| Data Acquisition System (DAS) Conversion from WTC to CISCO CeDAR5 - Start-Up Issues | 13 hours |
| Total duration of SO2 ppm CEMS downtime | 13 hours |
| Total operating time | 144 hours |
| Operating time with CEMS downtime | 9.0% |

Comment: Data Acquisition System (DAS) Conversion from WTC to CISCO CeDAR5 on 26-Mar-14

TGTU Incinerator CEMS Downtime
Frontier Refining LLC
SO2 ppm CEMS Downtime for 3/26/2014 thru 3/31/2014

| Parameter | Start | End | Duration | Reason | Action |
|----------------|--------------------|----------|----------|---|--|
| SO2 ppm | 3/26/2014 1:00 PM | 4:59 PM | 4 hours | Data Acquisition System (DAS) Conversion from WTC to CISCO CeDAR5 - Start-Up Issues | Troubleshoot DAS Conversion Start-Up Issues |
| SO2 ppm | 3/27/2014 11:00 AM | 11:59 AM | 1 hour | Data Acquisition System (DAS) Conversion from WTC to CISCO CeDAR5 - Start-Up Issues | Troubleshoot DAS Conversion Start-Up Issues |
| SO2 ppm | 3/28/2014 3:00 AM | 6:59 AM | 4 hours | Data Acquisition System (DAS) Conversion from WTC to CISCO CeDAR5 - Start-Up Issues | Troubleshoot DAS Conversion Start-Up Issues |
| SO2 ppm | 3/31/2014 6:00 AM | 9:59 AM | 4 hours | Data Acquisition System (DAS) Conversion from WTC to CISCO CeDAR5 - Start-Up Issues | Troubleshoot DAS Conversion Start-Up Issues |
| Total duration | | | 13 hours | | |

Comment: Data Acquisition System (DAS) Conversion from WTC to CISCO CeDAR5 on 28-Mar-14

1Q14

EXCESS EMISSION SUMMARY REPORT**Incinerator SO₂ (lb/hr) CEMS****1-hr average = 18.6 lb/hr****FORM B**

| Emission Data Summary (lb/hr) | | CMS Performance Report | |
|--|-------------|---|--------------|
| I. Duration of Excess Emission in Reporting Period Due to: | | I. CMS Downtime in Reporting Period Due to: | |
| A. Startup/Shutdown | 0.0 | A. Monitor Equipment Malfunction | 168.0 |
| B. Control Equipment Problems | 0.0 | B. Non-Monitor Equipment Malfunctions | 151.0 |
| C. Process Problem | 5.0 | C. Quality Assurance Calibration | 0.0 |
| D. Other Known Causes | 0.0 | D. Other Known Causes | 43.0 |
| E. Unknown Causes | 0.0 | E. Unknown Causes | 0.0 |
| II. Total Duration of Excess Emission | 5.0 | II. Total CMS Downtime | 362.0 |
| III. Total Duration of Excess Emissions x 100 divided by Total Source Operating Time minus Total CMS Downtime | 0.1% | III. Total CMS Downtime x 100 divided by Total Source Operating Time | 16.8% |

Total time of excess emission events due to emergency/abnormal operations: 0.

NOTE:

1. Only report excess emissions which occur when the unit/process is operating. Include all excess emissions in the Emission Data Summary including those excess emissions associated with startup/shutdown and those excess emissions associated with Chapter 1 Section 5 (Emergency/Abnormal) operations. Report times in hours for gaseous monitors and in tenths of an hour for opacity monitors. Include detailed excess emission information and causes in the Excess Emission Table (Form C).
2. Only report CEM downtime which occurs while the unit/process is operating. Report time in hours to one decimal point. Include detailed CEM downtime and causes in the Monitor Outage Table (Form D).
3. Include an explanation of what corrective actions were taken for total excess emissions or monitor downtime for the quarter (Emission Data Summary and CMS Performance Summary, Item III) greater than 5%. (See Instructions for further details.)

1Q14 TGTU Incinerator CEMS
Form C - Excess Emissions Summary

Incinerator SO2 lbs/hr (1-Hour)

| No. | Start Time | End Time | Max | Periods | Reason | Action |
|---------------------------------------|-----------------------|----------------------|------------|----------------|------------------------------------|--|
| 1 | 2/17/2014 11:00:00 PM | 2/18/2014 1:00:00 AM | 18.5 | 2 | SRU #2 shut down | Restarted unit |
| 2 | 3/4/2014 7:00:00 PM | 3/4/2014 9:00:00 PM | 20.7 | 2 | Process Upset - DHDS Rate Increase | Adjusted Unit Rates to Bring into Compliance |
| 3 | 3/4/2014 10:00:00 PM | 3/4/2014 11:00:00 PM | 22.1 | 1 | Process Upset - DHDS Rate Increase | Adjusted Unit Rates to Bring into Compliance |
| Total Periods Excess Emissions | | | | 5 | | |

TGTU Incinerator Excess Emissions Summary

Frontier Refining LLC

SO2 lbs 1-Hr Excess Emissions for 3/26/2014 thru 3/31/2014

| Reason | Duration |
|--|-----------------|
| <i>There are no excess emissions for this report.</i> | |
| Total duration of SO2 lbs 1-Hr excess emissions | 0 |
| Total operating time | 144 hours |
| Operating time with excess emissions | 0.0% |

Comment: Data Acquisition System (DAS) Conversion from WTC to CISCO CeDAR5 on 26-Mar-14

1Q14 TGTU Incinerator CEMS

Form D - Monitor Downtime Summary

Incinerator SO2 lbs/hr (1-Hour)

| No. | Start Time | End Time | Hours | Reason | Action |
|-----|-----------------------|-----------------------|-------|---|--|
| 1 | 1/8/2014 5:00:00 AM | 1/8/2014 6:00:00 AM | 1 | Sample system failure | Cleaned Sample Cell |
| 2 | 1/8/2014 10:00:00 AM | 1/8/2014 11:00:00 AM | 1 | Sample system failure | Cleaned Sample Cell |
| 3 | 1/8/2014 10:00:00 PM | 1/8/2014 11:00:00 PM | 1 | Sample system failure | Replaced Sample Line |
| 4 | 1/9/2014 9:00:00 AM | 1/9/2014 1:00:00 PM | 4 | Sample system failure | Replaced Sample Line |
| 5 | 1/13/2014 12:00:00 PM | 1/13/2014 3:00:00 PM | 3 | Sample system failure | Cleared probe and sample line, changed filters and steel wool. Ran Manual Cal. |
| 6 | 1/14/2014 10:00:00 AM | 1/14/2014 11:00:00 AM | 1 | Sample system failure | Leak Checked Sample Line - Replaced Sample Line |
| 7 | 1/20/2014 10:00:00 AM | 1/20/2014 11:00:00 AM | 1 | Sample system failure | Cleared probe and sample line, changed filters and steel wool. Ran Manual Cal. |
| 8 | 1/20/2014 3:00:00 PM | 1/20/2014 4:00:00 PM | 1 | Sample system failure | Cleared probe and sample line, changed filters and steel wool. Ran Manual Cal. |
| 9 | 1/21/2014 | 1/21/2014 2:00:00 AM | 2 | Sample system failure | Cleared probe and sample line, changed filters and steel wool. Ran Manual Cal. |
| 10 | 1/21/2014 9:00:00 AM | 1/21/2014 10:00:00 AM | 1 | Sample system failure | Cleared probe and sample line, changed filters and steel wool. Ran Manual Cal. |
| 11 | 1/22/2014 8:00:00 AM | 1/22/2014 1:00:00 PM | 5 | Sample system failure | Cleared probe and sample line, changed filters and steel wool. Ran Manual Cal. |
| 12 | 1/22/2014 6:00:00 PM | 1/22/2014 8:00:00 PM | 2 | Sample system failure | Cleared probe and sample line, changed filters and steel wool. Ran Manual Cal. |
| 13 | 1/22/2014 9:00:00 PM | 1/22/2014 10:00:00 PM | 1 | Sample system failure | Cleared probe and sample line, changed filters and steel wool. Ran Manual Cal. |
| 14 | 1/23/2014 3:00:00 AM | 1/23/2014 7:00:00 AM | 4 | Sample system failure | Cleared probe and sample line, changed filters and steel wool. Ran Manual Cal. |
| 15 | 1/23/2014 10:00:00 AM | 1/23/2014 1:00:00 PM | 3 | Sample system failure | Cleared probe and sample line, changed filters and steel wool. Ran Manual Cal. |
| 16 | 1/23/2014 9:00:00 PM | 1/24/2014 8:00:00 PM | 23 | SO2 Analyzer Issues - Appears to be Amine Contamination | Worked on Analyzer - Installed a Parallel SO2 Analyzer |
| 17 | 1/28/2014 5:00:00 AM | 1/28/2014 6:00:00 AM | 1 | SO2 Analyzer Issues - Appears to be Amine Contamination | Worked on Analyzer - Installed a Parallel SO2 Analyzer |

1Q14 TGTU Incinerator CEMS

Form D - Monitor Downtime Summary

Incinerator SO2 lbs/hr (1-Hour)

| No. | Start Time | End Time | Hours | Reason | Action |
|-----|-----------------------|-----------------------|-------|---|--|
| 18 | 1/28/2014 8:00:00 AM | 1/28/2014 10:00:00 AM | 2 | SO2 Analyzer Issues - Appears to be Amine Contamination | Worked on Analyzer - Installed a Parallel SO2 Analyzer |
| 19 | 1/28/2014 1:00:00 PM | 1/28/2014 5:00:00 PM | 4 | SO2 Analyzer Issues - Appears to be Amine Contamination | Worked on Analyzer - Installed a Parallel SO2 Analyzer |
| 20 | 1/29/2014 11:00:00 AM | 1/29/2014 12:00:00 PM | 1 | SO2 Analyzer Issues - Appears to be Amine Contamination | Worked on Analyzer - Installed a Parallel SO2 Analyzer |
| 21 | 1/30/2014 2:00:00 AM | 1/30/2014 3:00:00 AM | 1 | SO2 Analyzer Issues - Appears to be Amine Contamination | Worked on Analyzer - Installed a Parallel SO2 Analyzer |
| 22 | 1/30/2014 5:00:00 AM | 1/30/2014 6:00:00 AM | 1 | SO2 Analyzer Issues - Appears to be Amine Contamination | Worked on Analyzer - Installed a Parallel SO2 Analyzer |
| 23 | 1/31/2014 4:00:00 PM | 1/31/2014 6:00:00 PM | 2 | SO2 Analyzer Issues - Appears to be Amine Contamination | Worked on Analyzer - Installed a Parallel SO2 Analyzer |
| 24 | 1/31/2014 9:00:00 PM | 1/31/2014 10:00:00 PM | 1 | SO2 Analyzer Issues - Appears to be Amine Contamination | Worked on Analyzer - Installed a Parallel SO2 Analyzer |
| 25 | 2/1/2014 | 2/1/2014 7:00:00 AM | 7 | SO2 Analyzer Issues - Appears to be Amine Contamination | Worked on Analyzer - Installed a Parallel SO2 Analyzer |
| 26 | 2/1/2014 11:00:00 AM | 2/1/2014 1:00:00 PM | 2 | SO2 Analyzer Issues - Appears to be Amine Contamination | Worked on Analyzer - Installed a Parallel SO2 Analyzer |
| 27 | 2/1/2014 5:00:00 PM | 2/1/2014 8:00:00 PM | 3 | SO2 Analyzer Issues - Appears to be Amine Contamination | Worked on Analyzer - Installed a Parallel SO2 Analyzer |
| 28 | 2/2/2014 9:00:00 AM | 2/2/2014 10:00:00 AM | 1 | SO2 Analyzer Issues - Appears to be Amine Contamination | Worked on Analyzer - Installed a Parallel SO2 Analyzer |
| 29 | 2/2/2014 11:00:00 AM | 2/2/2014 12:00:00 PM | 1 | SO2 Analyzer Issues - Appears to be Amine Contamination | Worked on Analyzer - Installed a Parallel SO2 Analyzer |
| 30 | 2/2/2014 3:00:00 PM | 2/2/2014 4:00:00 PM | 1 | SO2 Analyzer Issues - Appears to be Amine Contamination | Worked on Analyzer - Installed a Parallel SO2 Analyzer |
| 31 | 2/3/2014 3:00:00 PM | 2/3/2014 5:00:00 PM | 2 | SO2 Analyzer Issues - Appears to be Amine Contamination | Worked on Analyzer - Installed a Parallel SO2 Analyzer |
| 32 | 2/3/2014 7:00:00 PM | 2/3/2014 11:00:00 PM | 4 | SO2 Analyzer Issues - Appears to be Amine Contamination | Worked on Analyzer - Installed a Parallel SO2 Analyzer |
| 33 | 2/7/2014 9:00:00 AM | 2/7/2014 2:00:00 PM | 5 | SO2 Analyzer Issues - Appears to be Amine Contamination | Worked on Analyzer - Installed a Parallel SO2 Analyzer |

1Q14 TGTU Incinerator CEMS

Form D - Monitor Downtime Summary

Incinerator SO2 lbs/hr (1-Hour)

| No. | Start Time | End Time | Hours | Reason | Action |
|-----|-----------------------|-----------------------|-------|--|--|
| 34 | 2/7/2014 3:00:00 PM | 2/7/2014 11:00:00 PM | 8 | SO2 Analyzer Issues - Appears to be Amine Contamination | Worked on Analyzer - Installed a Parallel SO2 Analyzer |
| 35 | 2/8/2014 2:00:00 AM | 2/8/2014 9:00:00 AM | 7 | SO2 Analyzer Issues - Appears to be Amine Contamination | Worked on Analyzer - Installed a Parallel SO2 Analyzer |
| 36 | 2/8/2014 11:00:00 AM | 2/8/2014 7:00:00 PM | 8 | SO2 Analyzer Issues - Appears to be Amine Contamination | Worked on Analyzer - Installed a Parallel SO2 Analyzer |
| 37 | 2/8/2014 8:00:00 PM | 2/8/2014 9:00:00 PM | 1 | SO2 Analyzer Issues - Appears to be Amine Contamination | Worked on Analyzer - Installed a Parallel SO2 Analyzer |
| 38 | 2/8/2014 10:00:00 PM | 2/9/2014 3:00:00 AM | 5 | SO2 Analyzer Issues - Appears to be Amine Contamination | Worked on Analyzer - Installed a Parallel SO2 Analyzer |
| 39 | 2/9/2014 11:00:00 AM | 2/9/2014 3:00:00 PM | 4 | SO2 Analyzer Issues - Appears to be Amine Contamination | Worked on Analyzer - Installed a Parallel SO2 Analyzer |
| 40 | 2/9/2014 6:00:00 PM | 2/9/2014 8:00:00 PM | 2 | SO2 Analyzer Issues - Appears to be Amine Contamination | Worked on Analyzer - Installed a Parallel SO2 Analyzer |
| 41 | 2/9/2014 9:00:00 PM | 2/9/2014 10:00:00 PM | 1 | SO2 Analyzer Issues - Appears to be Amine Contamination | Worked on Analyzer - Installed a Parallel SO2 Analyzer |
| 42 | 2/10/2014 10:00:00 AM | 2/10/2014 7:00:00 PM | 9 | SO2 Analyzer Issues - Appears to be Amine Contamination | Worked on Analyzer - Installed a Parallel SO2 Analyzer |
| 43 | 2/10/2014 10:00:00 PM | 2/10/2014 11:00:00 PM | 1 | SO2 Analyzer Issues - Appears to be Amine Contamination | Worked on Analyzer - Installed a Parallel SO2 Analyzer |
| 44 | 2/11/2014 | 2/11/2014 2:00:00 PM | 14 | SO2 Analyzer Issues - Appears to be Amine Contamination | Worked on Analyzer - Installed a Parallel SO2 Analyzer |
| 45 | 2/11/2014 3:00:00 PM | 2/11/2014 9:00:00 PM | 6 | SO2 Analyzer Issues - Appears to be Amine Contamination | OEM Service Technician Troubleshooting |
| 46 | 2/12/2014 11:00:00 AM | 2/12/2014 1:00:00 PM | 2 | SO2 Analyzer Issues - Appears to be Amine Contamination | OEM Service Technician Troubleshooting |
| 47 | 2/13/2014 6:00:00 PM | 2/14/2014 12:00:00 PM | 18 | SO2 Analyzer Issues | Cleared probe and sample line, changed filters and steel wool. Ran Manual Cal. |
| 48 | 2/27/2014 1:00:00 AM | 3/3/2014 1:00:00 PM | 108 | SO2 Analyzer Issues | Worked on Analyzer - Pulling Draegers every Hour |
| 49 | 3/14/2014 11:00:00 AM | 3/14/2014 12:00:00 PM | 1 | Sulfur Unit problems caused high SO2, knocking CEMS out of calibration | Cleared probe and sample line, changed filters and steel wool. Ran Manual Cal. |

1Q14 TGTU Incinerator CEMS

Form D - Monitor Downtime Summary

Incinerator SO2 lbs/hr (1-Hour)

| No. | Start Time | End Time | Hours | Reason | Action |
|--|-----------------------|-----------------------|------------|--|--|
| 50 | 3/14/2014 8:00:00 PM | 3/14/2014 10:00:00 PM | 1 | Sulfur Unit problems caused high SO2, knocking CEMS out of calibration | Cleared probe and sample line, changed filters and steel wool, Ran Manual Cal. |
| 51 | 3/14/2014 11:00:00 PM | 3/15/2014 1:00:00 AM | 2 | Sulfur Unit problems caused high SO2, knocking CEMS out of calibration | Cleared probe and sample line, changed filters and steel wool, Ran Manual Cal. |
| 52 | 3/15/2014 1:00:00 PM | 3/15/2014 2:00:00 PM | 1 | Sulfur Unit problems caused high SO2, knocking CEMS out of calibration | Cleared probe and sample line, changed filters and steel wool, Ran Manual Cal. |
| 53 | 3/15/2014 3:00:00 PM | 3/15/2014 10:00:00 PM | 7 | Sulfur Unit problems caused high SO2, knocking CEMS out of calibration | Cleared probe and sample line, changed filters and steel wool, Ran Manual Cal. |
| 54 | 3/15/2014 11:00:00 PM | 3/16/2014 | 1 | Sulfur Unit problems caused high SO2, knocking CEMS out of calibration | Cleared probe and sample line, changed filters and steel wool, Ran Manual Cal. |
| 55 | 3/16/2014 1:00:00 AM | 3/16/2014 2:00:00 AM | 1 | Sulfur Unit problems caused high SO2, knocking CEMS out of calibration | Cleared probe and sample line, changed filters and steel wool, Ran Manual Cal. |
| 56 | 3/16/2014 3:00:00 AM | 3/16/2014 4:00:00 AM | 1 | Sulfur Unit problems caused high SO2, knocking CEMS out of calibration | Cleared probe and sample line, changed filters and steel wool, Ran Manual Cal. |
| 57 | 3/16/2014 6:00:00 AM | 3/16/2014 9:00:00 AM | 3 | Sulfur Unit problems caused high SO2, knocking CEMS out of calibration | Cleared probe and sample line, changed filters and steel wool, Ran Manual Cal. |
| 58 | 3/16/2014 12:00:00 PM | 3/16/2014 3:00:00 PM | 3 | Sulfur Unit problems caused high SO2, knocking CEMS out of calibration | Cleared probe and sample line, changed filters and steel wool, Ran Manual Cal. |
| 59 | 3/17/2014 11:00:00 PM | 3/18/2014 | 1 | SO2 Analyzer Issues | No Action Taken - Self Corrected |
| 60 | 3/22/2014 5:00:00 AM | 3/22/2014 8:00:00 AM | 3 | SO2 Analyzer Issues | Cleared Probe, changed Filters and Steel Wool |
| 61 | 3/22/2014 9:00:00 AM | 3/22/2014 3:00:00 PM | 6 | SO2 Analyzer Issues | Cleared Probe, changed Filters and Steel Wool |
| 62 | 3/25/2014 2:00:00 PM | 3/25/2014 3:00:00 PM | 1 | SO2 Analyzer Issues | No Action Taken - Self Corrected |
| Total Hours Monitor Unavailable | | | 319 | | |

TGTU Incinerator CEMS Downtime Summary

Frontier Refining LLC

SO2 lbs CEMS Downtime for 3/28/2014 thru 3/31/2014

| Reason | Duration |
|---|------------------|
| Data Acquisition System (DAS) Conversion from WTC to CISCO CeDAR5 - Stack Flow Start-Up Issues | 35 hours |
| Data Acquisition System (DAS) Conversion from WTC to CISCO CeDAR5 - Start-Up Issues | 8 hours |
| Total duration of SO2 lbs CEMS downtime | 43 hours |
| Total operating time | 144 hours |
| Operating time with CEMS downtime | 29.9% |

Comment: Data Acquisition System (DAS) Conversion from WTC to CISCO CeDAR5 on 28-Mar-14

TGTU Incinerator CEMS Downtime
Frontier Refining LLC
SO2 lbs CEMS Downtime for 3/26/2014 thru 3/31/2014

| Parameter | Start | End | Duration | Reason | Action |
|----------------|--------------------|----------|----------|---|--|
| SO2 lbs | 3/26/2014 1:00 PM | 11:59 PM | 11 hours | Data Acquisition System (DAS) Conversion from WTC to CISCO CeDAR5 - Stack Flow Start-Up Issues | Troubleshoot DAS Conversion Start-Up Issues |
| SO2 lbs | 3/27/2014 12:00 AM | 11:59 PM | 24 hours | Data Acquisition System (DAS) Conversion from WTC to CISCO CeDAR5 - Stack Flow Start-Up Issues | Troubleshoot DAS Conversion Start-Up Issues |
| SO2 lbs | 3/28/2014 3:00 AM | 6:59 AM | 4 hours | Data Acquisition System (DAS) Conversion from WTC to CISCO CeDAR5 - Start-Up Issues | Troubleshoot DAS Conversion Start-Up Issues |
| SO2 lbs | 3/31/2014 6:00 AM | 9:59 AM | 4 hours | Data Acquisition System (DAS) Conversion from WTC to CISCO CeDAR5 - Start-Up Issues | Troubleshoot DAS Conversion Start-Up Issues |
| Total duration | | | 43 hours | | |

Comment: Data Acquisition System (DAS) Conversion from WTC to CISCO CeDAR5 on 28-Mar-14

Data Sheet for TGTU Incinerator CEM System Cylinder Gas Audit

1. Date Audit Commenced: 26-Mar-14 Time Audit Commenced: 9:50 a.m.

2. Audit Gases Used for CGA (All gases to be Protocol 1 Certified):

| Acceptable Audit Gas Ranges | Cylinder Number and Expiration Date | Audit Gas Concentrations | | +/- of Audit Gas Range |
|--|-------------------------------------|--------------------------|-----|------------------------|
| SO ₂ Low: <i>100 - 150 ppm</i> | EB0038571 | 127.20 | ppm | 39.75% |
| | 3-Mar-22 | | | |
| SO ₂ Mid: <i>250 - 300 ppm</i> | CC420619 | 300.70 | ppm | 93.97% |
| | 28-Feb-21 | | | |
| O ₂ Low: 4 - 6% by volume | CC420681 | 4.96 | % | 19.85% |
| | 4-Mar-21 | | | |
| O ₂ Mid: 8 - 12% by volume | CC2603 | 9.95 | % | 39.82% |
| | 5-Mar-21 | | | |

3. CEM System Response:

| | Low-Span NO _x | | Mid-Span NO _x | | Low-Span O ₂ | | Mid-Span O ₂ | |
|------------------------|--------------------------|---------|--------------------------|---------|-------------------------|---------|-------------------------|---------|
| | Analyzer | CeDAR | Analyzer | CeDAR | Analyzer | CeDAR | Analyzer | CeDAR |
| Run 1 | 130.00 | NA | 301.00 | NA | 4.88 | NA | 9.84 | NA |
| Run 2 | 118.00 | NA | 306.00 | NA | 4.88 | NA | 9.83 | NA |
| Run 3 | 127.00 | NA | 308.00 | NA | 4.88 | NA | 9.83 | NA |
| Avg. (d _m) | 125.00 | #DIV/0! | 305.00 | #DIV/0! | 4.88 | #DIV/0! | 9.83 | #DIV/0! |
| A | 1.73% | #DIV/0! | 1.43% | #DIV/0! | 1.67% | #DIV/0! | 1.21% | #DIV/0! |
| Pass? | Yes | #DIV/0! | Yes | #DIV/0! | Yes | #DIV/0! | Yes | #DIV/0! |

4. Signature of Technician(s) performing CGA:


Matt Hobbs, Kevin Marschner and/or Tad Milliken

Calculation of A:

$$A = (d_m - c_a) / c_a \times 100$$

A must be +/-15% to pass.

where:

A = accuracy of CEM

d_m = average of responses

c_a = certified audit value of gas



A DIVISION OF NORCO, INC.

Calibration Gases & Equipment

EPA Protocol Standard Gas Mixture

Report of Analysis and Certification

To:
Norco, Inc
Cheyenne Warehouse
100 S. Greeley HWY
Cheyenne, WY 82007

Manufactured at/by:
EPA Protocol Vendor ID P12013

NorLab Order # 34020710
Customer PO# N/A
Part Number SPG 5E1079125PN
Lot Number: 4-049-521
Cylinder Number EB0038571

Date Certified: 03/04/14
Cylinder Pressure: 2000 psig @ 70 F
Expiration Date: 03/03/22

| Component(s) | Conc. V/V | ± EPA Uncertainty | Analyzer1 (SO2) | MTO 60a FTIR | | |
|-------------------------|--------------------------|-------------------|-----------------|---------------|-----------|-----------|
| Sulfur Dioxide, ppm | 127.2 | 1.2 | Calibrated: | Assay 1; 2; 3 | 2/12/2014 | 2/12/2014 |
| Nitrogen, O2 Free | | | | | | |
| Reference Standard Data | | | | | | |
| Component | Lot# and XP Date (MM/YR) | ID | Cyl# | Sam# | Conc. | U |
| Sulfur Dioxide, ppm | 8-035-175 XP 3X16 | GMIS1661A | CC 32121 | N/A | 101.9 | 0.82 |
| Traceable Std # GMIS | 9-128-600 XP 1X17 | SRM 1661A | FF26137 | 94-H-18 | 490.8 | 3.9 |
| Replicate Analysis Data | | | | | | |
| Assay 1 | | Assay 2 | | Assay 3 | | |
| SO2 | | SO2 | | | | |
| 2/25/2014 | | 3/4/2014 | | | | |
| 127.2 | | | | | | |
| 127.4 | | | | | | |
| 127.1 | | | | | | |
| 127.3 | | | | | | |
| 0.0 | | 0.0 | | | | |
| 0.0 | | 0.0 | | | | |
| | | | | | | |
| 127.2 | | 127.2 | | | | |

The analysis listed in this report was performed in accordance with the Procedure G1 of the EPA Traceability Protocol, EPA 600/R-12/531 May 2012.

The contents of this cylinder must not be used if the pressure is less than 100 psig.

Analyst:
Aaron Schwenken, Lab Technician

Approved:
Jeff Korn, Quality Assurance Unit

2Q14

DEPARTMENT OF ENVIRONMENTAL QUALITY
AIR QUALITY DIVISION
CONTINUOUS EMISSION MONITORING REPORT

FORM A

I. GENERAL INFORMATION

- A. Facility Name: FRONTIER REFINING LLC
B. Process Unit/Pollutant Monitored: SO₂ MONITOR - NO. 1 AND NO. 2 SULFUR RECOVERY UNITS (COMMON STACK)
C. Applicable Permit Number or Regulation: NSPS Subpart J, CT-84A2, MD-188, MD-1115A
D. Applicable Emission Limit: 250 ppmvd @ 0% O₂ (12-hr rolling average); 18.6 lb/hr (1-hr average)

II. MONITOR INFORMATION

- A. Date of Original Monitor Installation: June 28, 2000
B. Date of Latest Monitor Certification: August 21, 2000
C. Pollutant/Opacity Monitor
1. Manufacturer: Brimstone Instrumentation LTD.
2. Model Number: BRM 991-CEM
3. Serial Number Main Chassis: CEM-00002-00003
4. Basis of Measurement (If Applicable - Wet or Dry): Wet
5. Instrument Span, Range Value (Specify Units): 0 - 500 ppm SO₂
D. Diluent Monitor
1. Type of Monitor: O₂
2. Manufacturer: AMETEK Process & Analytical Division
3. Model Number: Series 2000
4. Serial Number Main Chassis: 10202890
5. Basis of Measurement (If Applicable - Wet or Dry): Wet
6. Instrument Span, Range Value (Specify Units): 0 - 25 percent (%)
E. Flow Monitor
1. Type of Instrument (i.e. S-type Pitot Tube): Pitot Tube
2. Manufacturer:
3. Model Number: _____
4. Serial Number Main Chassis:
F. Quality Assurance Data
1. QA Plan Date: January 7, 2013
2. QA Plan Approval Date: August 29, 2013

III. Operating/Monitoring Data

A. Quarter: 2 Year: 2014

B Total Hours in Reporting Period: 2184

C. Hours Unit Operated During the Reporting Period: 2184 (Hours with one or both SRU's operating)

Note: Include all unit operating time for the quarter including operating time associated with Startup/Shutdown and Chapter 1 Section 5 (Emergency/Abnormal) Operations. Report time in hours to one decimal place, i.e. 1902.8.

IV. Quarterly Audits/Monitoring System Modifications

A. Quarterly Audits

Type Audit: CGA

| | <u>Date Conducted</u> | <u>Pass</u> |
|----------------------------|-----------------------|-------------|
| Pollutant/Opacity Monitor: | <u>6/6/2014</u> | <u>Yes</u> |
| Diluent Monitor | <u>6/6/2014</u> | <u>Yes</u> |

Note: A copy of the quarterly audits shall be included with the corresponding quarterly excess emission report.

B. Equipment Replaced During Reporting Period: Changed Sample Filters; Changed SO₂ Span Calibration Bottle; Replaced RTD.

Note: Only equipment replacements or modifications to the system that could affect the ability of the continuous monitoring system to comply with the associated Performance Specification shall be reported.

V. Report Contact

A. Name: David Weeks, Environmental Engineer

B. Phone Number: (307) 771-8827

2Q14

EXCESS EMISSION SUMMARY REPORT
Incinerator SO₂ (ppm) CEMS
12-hr rolling average = 250 ppm @ 0 % O₂

FORM B

| Emission Data Summary (12-hour average ppm) | | CMS Performance Report | |
|--|-------------|---|--------------|
| I. Duration of Excess Emission in Reporting Period Due to: | | I. CMS Downtime in Reporting Period Due to: | |
| A. Startup/Shutdown | 0.0 | A. Monitor Equipment Malfunction | 130.0 |
| B. Control Equipment Problems | 0.0 | B. Non-Monitor Equipment Malfunctions | 0.0 |
| C. Process Problem | 7.0 | C. Quality Assurance Calibration | 0.0 |
| D. Other Known Causes | 0.0 | D. Other Known Causes | 2.0 |
| E. Unknown Causes | 0.0 | E. Unknown Causes | 0.0 |
| II. Total Duration of Excess Emission | 7.0 | II. Total CMS Downtime | 132.0 |
| III. Total Duration of Excess Emissions x 100 divided by Total Source Operating Time minus Total CMS Downtime | 0.3% | III. Total CMS Downtime x 100 divided by Total Source Operating Time | 6.0% |

Total time of excess emission events due to emergency/abnormal operations: 0.

NOTE:

1. Only report excess emissions which occur when the unit/process is operating. Include all excess emissions in the Emission Data Summary including those excess emissions associated with startup/shutdown and those excess emissions associated with Chapter 1 Section 5 (Emergency/Abnormal) operations. Report times in hours for gaseous monitors and in tenths of an hour for opacity monitors. Include detailed excess emission information and causes in the Excess Emission Table (Form C).
2. Only report CEM downtime which occurs while the unit/process is operating. Report time in hours to one decimal point. Include detailed CEM downtime and causes in the Monitor Outage Table (Form D).
3. Include an explanation of what corrective actions were taken for total excess emissions or monitor downtime for the quarter (Emission Data Summary and CMS Performance Summary, Item III) greater than 5%. (See Instructions for further details.)

TGTU Incinerator Excess Emissions Summary

Frontier Refining LLC

SO2 ppm (dry) @0% O2 12-Hr Rolling Excess Emissions for 4/1/2014 thru 6/30/2014

| Reason | Duration |
|--|-------------------|
| Process Upset - SWS Temperature and Pressure Issues | 7 hours |
| Total duration of SO2 ppm (dry) @0% O2 12-Hr Rolling excess emissions | 7 hours |
| Total operating time | 2184 hours |
| Operating time with excess emissions | 0.3% |

Comment: Form C - Excess Emission Summary

TGTU Incinerator Excess Emissions

Frontier Refining LLC

SO2 ppm (dry) @0% O2 12-Hr Rolling Excess Emissions for 4/1/2014 thru 6/30/2014

| Parameter | Start | End | Duration | Value | Min | Max | Limit | Reason | Action |
|---------------------------------------|------------------|----------|----------|-------|-------|-------|-------|---|----------------------------|
| SO2 ppm (dry) @0% O2 12-Hr Rolling | 5/8/2014 4:00 AM | 10:59 AM | 7 hours | 287.7 | 250.8 | 305.8 | 250 | Process Upset - SWS Temperature and Pressure Issues | Made Louver Adjustments |
| Total duration | | | 7 hours | | | | | | |

Comment: Form C - Excess Emission Summary

TGTU Incinerator CEMS Downtime Summary

Frontier Refining LLC

SO2 ppm CEMS Downtime for 4/1/2014 thru 6/30/2014

| Reason | Duration |
|--|-------------------|
| Analyzer Out of Control - During startup of SRU2 they were running the start gasses thru the incinerator. This was leaving a light coating on the lenses which caused the analyzer to drift towards a negative number. | 16 hours |
| Failed Morning O2% & SO2 ppm Span Calibration Checks - OOC | 2 hours |
| Failed Morning SO2 ppm Zero & Span Calibration Check | 9 hours |
| Failed Morning SO2 Span Calibration Check | 2 hours |
| Failed Morning SO2 Zero Calibration Check | 2 hours |
| Maintenance | 2 hours |
| Sample Filters Plugged after Unit Excursion | 3 hours |
| Sample Interface Malfunction | 53 hours |
| Sample Interface Malfunction - Zinc Cell Heater | 17 hours |
| Sample Interface Malfunction - Zinc Cell Heater | 1 hour |
| Sample System Malfunction | 22 hours |
| SO2 Analyzer Out-of-Range - Result of Prior Upsets caused by Boilers #1 & #2 Shutdown | 3 hours |
| Total duration of SO2 ppm CEMS downtime | 132 hours |
| Total operating time | 2184 hours |
| Operating time with CEMS downtime | 6.0% |

Comment: Form D - Downtime Summary

TGTU Incinerator CEMS Downtime

Frontier Refining LLC

SO2 ppm CEMS Downtime for 4/1/2014 thru 6/30/2014

| Parameter | Start | End | Duration | Reason | Action |
|-----------|--------------------|----------|----------|---|--|
| SO2 ppm | 4/1/2014 2:00 AM | 4:59 AM | 3 hours | Sample System Malfunction | Passed Morning Calibration Check |
| SO2 ppm | 4/1/2014 9:00 AM | 9:59 AM | 1 hour | Maintenance | Replaced RTD going to SO2 Incinerator. |
| SO2 ppm | 4/2/2014 5:00 AM | 8:59 AM | 4 hours | Sample System Malfunction | Self Corrected |
| SO2 ppm | 4/10/2014 9:00 AM | 9:59 AM | 1 hour | Maintenance | Took unit out of service to zero and clean probe. Probe was partially plugged. |
| SO2 ppm | 4/11/2014 5:00 PM | 7:59 PM | 3 hours | Sample Interface Malfunction | Self Corrected |
| SO2 ppm | 4/12/2014 7:00 AM | 11:59 AM | 5 hours | Sample Interface Malfunction | Self Corrected |
| SO2 ppm | 4/13/2014 7:00 AM | 11:59 PM | 17 hours | Sample Interface Malfunction | Passed Manual Calibration |
| SO2 ppm | 4/14/2014 12:00 AM | 1:59 PM | 14 hours | Sample Interface Malfunction | Passed Manual Calibration |
| SO2 ppm | 4/14/2014 10:00 PM | 11:59 PM | 2 hours | Sample Interface Malfunction | Self Corrected |
| SO2 ppm | 4/15/2014 12:00 AM | 1:59 AM | 2 hours | Sample Interface Malfunction | Self Corrected |
| SO2 ppm | 4/17/2014 5:00 AM | 6:59 AM | 2 hours | Failed Morning SO2 Zero Calibration Check | Adjusted zero on incinerator SO2 analyzer. Ran validation. |
| SO2 ppm | 4/20/2014 10:00 AM | 2:59 PM | 5 hours | Sample Interface Malfunction - Zinc Cell Heater | Zinc Cell heater was reading low and causing readings to be invalid. Adjusted heater and started working again on 27-Apr-14. |
| SO2 ppm | 4/20/2014 4:00 PM | 6:59 PM | 3 hours | Sample Interface Malfunction - Zinc Cell Heater | Zinc Cell heater was reading low and causing readings to be invalid. Adjusted heater and started working again on 27-Apr-14. |
| SO2 ppm | 4/22/2014 5:00 PM | 6:59 PM | 2 hours | Sample Interface Malfunction - Zinc Cell Heater | Zinc Cell heater was reading low and causing readings to be invalid. Adjusted heater |
| SO2 ppm | 4/26/2014 8:00 AM | 2:59 PM | 7 hours | Sample Interface Malfunction - Zinc Cell Heater | Zinc Cell heater was reading low and causing readings to be invalid. Adjusted heater |
| SO2 ppm | 4/27/2014 11:00 AM | 11:59 AM | 1 hour | Sample Interface Malfunction - Zinc Cell Heater | Zinc Cell heater was reading low and causing readings to be invalid. Adjusted heater. |

| Parameter | Start | End | Duration | Reason | Action |
|----------------|--------------------|----------|-----------|--|---|
| SO2 ppm | 4/29/2014 12:00 AM | 9:59 AM | 10 hours | Sample Interface Malfunction | Changed out sample filter and cleared the alarm on the analyzer. |
| SO2 ppm | 4/29/2014 6:00 PM | 11:59 PM | 6 hours | Sample System Malfunction | Took SO2 out of service to perform testing of the flow system. Waiting on part to fix flow. |
| SO2 ppm | 4/30/2014 12:00 AM | 8:59 AM | 9 hours | Sample System Malfunction | Took SO2 out of service to perform testing of the flow system. Waiting on part to fix flow. |
| SO2 ppm | 5/7/2014 7:00 AM | 8:59 AM | 2 hours | Failed Morning SO2 Span Calibration Check | Ran zero and span calibration and manually adjusted settings. Performed maintenance on unit as well changing out filter. |
| SO2 ppm | 5/28/2014 4:00 PM | 6:59 PM | 3 hours | Sample Filters Plugged after Unit Excursion | Changed Filters |
| SO2 ppm | 6/14/2014 12:00 AM | 1:59 AM | 2 hours | SO2 Analyzer Out-of-Range - Result of Prior Upsets caused by Boilers #1 & #2 Shutdown | Pulled and cleaned filters and tubing. |
| SO2 ppm | 6/14/2014 4:00 AM | 4:59 AM | 1 hour | SO2 Analyzer Out-of-Range - Result of Prior Upsets caused by Boilers #1 & #2 Shutdown | Pulled and cleaned filters and tubing. |
| SO2 ppm | 6/14/2014 5:00 AM | 1:59 PM | 9 hours | Failed Morning SO2 ppm Zero & Span Calibration Check | Changed sample probe filter. Ran Manual Calibration |
| SO2 ppm | 6/15/2014 5:00 AM | 6:59 AM | 2 hours | Failed Morning O2% & SO2 ppm Span Calibration Checks - OOC | Changed sample probe filter. Ran validation on both analyzers. |
| SO2 ppm | 6/30/2014 8:00 AM | 11:59 PM | 16 hours | Analyzer Out of Control - During startup of SRU2 they were running the start gasses thru the incinerator. This was leaving a light coating on the lenses which caused the analyzer to drift towards a negative number. | Cleaned the lenses multiple times and purged the lines but still had problems with the lenses being contaminated. Switching SRU2 to tailgas eliminated the contamination of the lenses. |
| Total duration | | | 132 hours | | |

Comment: Form D - Downtime Summary

2Q14

EXCESS EMISSION SUMMARY REPORT
Incinerator SO₂ (lb/hr) CEMS
1-hr average = 18.6 lb/hr

FORM B

| Emission Data Summary (lb/hr) | | CMS Performance Report | |
|--|-------------|---|--------------|
| I. Duration of Excess Emission in Reporting Period Due to: | | I. CMS Downtime in Reporting Period Due to: | |
| A. Startup/Shutdown | 0.0 | A. Monitor Equipment Malfunction | 130.0 |
| B. Control Equipment Problems | 0.0 | B. Non-Monitor Equipment Malfunctions | 0.0 |
| C. Process Problem | 1.0 | C. Quality Assurance Calibration | 0.0 |
| D. Other Known Causes | 0.0 | D. Other Known Causes | 2.0 |
| E. Unknown Causes | 0.0 | E. Unknown Causes | 0.0 |
| II. Total Duration of Excess Emission | 1.0 | II. Total CMS Downtime | 132.0 |
| III. Total Duration of Excess Emissions x 100 divided by Total Source Operating Time minus Total CMS Downtime | 0.0% | III. Total CMS Downtime x 100 divided by Total Source Operating Time | 6.0% |

Total time of excess emission events due to emergency/abnormal operations: 0.

NOTE:

1. Only report excess emissions which occur when the unit/process is operating. Include all excess emissions in the Emission Data Summary including those excess emissions associated with startup/shutdown and those excess emissions associated with Chapter 1 Section 5 (Emergency/Abnormal) operations. Report times in hours for gaseous monitors and in tenths of an hour for opacity monitors. Include detailed excess emission information and causes in the Excess Emission Table (Form C).
2. Only report CEM downtime which occurs while the unit/process is operating. Report time in hours to one decimal point. Include detailed CEM downtime and causes in the Monitor Outage Table (Form D).
3. Include an explanation of what corrective actions were taken for total excess emissions or monitor downtime for the quarter (Emission Data Summary and CMS Performance Summary, Item III) greater than 5%. (See Instructions for further details.)

TGTU Incinerator Excess Emissions Summary

Frontier Refining LLC

SO2 lbs 1-Hr Excess Emissions for 4/1/2014 thru 6/30/2014

| Reason | Duration |
|--|-------------------|
| Process Upset - SWS Temperature and Pressure Issues | 1 hour |
| Total duration of SO2 lbs 1-Hr excess emissions | 1 hour |
| Total operating time | 2184 hours |
| Operating time with excess emissions | 0.0% |

Comment: Form C - Excess Emission Summary

TGTU Incinerator Excess Emissions
Frontier Refining LLC
SO2 lbs 1-Hr Excess Emissions for 4/1/2014 thru 6/30/2014

| Parameter | Start | End | Duration | Value | Min | Max | Limit | Reason | Action |
|----------------|-------------------|----------|----------|-------|-------|-------|-------|---|-------------------------|
| SO2 lbs 1-Hr | 5/7/2014 11:00 PM | 11:59 PM | 1 hour | 19.10 | 19.10 | 19.10 | 18.6 | Process Upset - SWS Temperature and Pressure Issues | Made Louver Adjustments |
| Total duration | | | 1 hour | | | | | | |

Comment: Form C - Excess Emission Summary

TGTU Incinerator CEMS Downtime Summary

Frontier Refining LLC

SO2 lbs CEMS Downtime for 4/1/2014 thru 6/30/2014

| Reason | Duration |
|--|-------------------|
| Analyzer Out of Control - During startup of SRU2 they were running the start gasses thru the Incinerator. This was leaving a light coating on the lenses which caused the analyzer to drift towards a negative number. | 16 hours |
| Failed Morning O2% & SO2 ppm Span Calibration Checks - OOC | 2 hours |
| Failed Morning SO2 ppm Zero & Span Calibration Check | 9 hours |
| Failed Morning SO2 Span Calibration Check | 2 hours |
| Failed Morning SO2 Zero Calibration Check | 2 hours |
| Maintenance | 2 hours |
| Sample Filters Plugged after Unit Excursion | 3 hours |
| Sample Interface Malfunction | 63 hours |
| Sample Interface Malfunction - Zinc Cell Heater | 17 hours |
| Sample Interface Malfunction - Zinc Cell Heater | 1 hour |
| Sample System Malfunction | 22 hours |
| SO2 Analyzer Out-of-Range - Result of Prior Upsets caused by Boilers #1 & #2 Shutdown | 3 hours |
| Total duration of SO2 lbs CEMS downtime | 132 hours |
| Total operating time | 2184 hours |
| Operating time with CEMS downtime | 6.0% |

Comment: Form D - Downtime Summary

TGTU Incinerator CEMS Downtime

Frontier Refining LLC

SO2 lbs CEMS Downtime for 4/1/2014 thru 6/30/2014

| Parameter | Start | End | Duration | Reason | Action |
|-----------|--------------------|----------|----------|---|--|
| SO2 lbs | 4/1/2014 2:00 AM | 4:59 AM | 3 hours | Sample System Malfunction | Passed Morning Calibration Check |
| SO2 lbs | 4/1/2014 9:00 AM | 9:59 AM | 1 hour | Maintenance | Replaced RTD going to SO2 incinerator. |
| SO2 lbs | 4/2/2014 5:00 AM | 8:59 AM | 4 hours | Sample System Malfunction | Self Corrected |
| SO2 lbs | 4/10/2014 9:00 AM | 9:59 AM | 1 hour | Maintenance | Took unit out of service to zero and clean probe. Probe was partially plugged. |
| SO2 lbs | 4/11/2014 5:00 PM | 7:59 PM | 3 hours | Sample Interface Malfunction | Self Corrected |
| SO2 lbs | 4/12/2014 7:00 AM | 11:59 AM | 5 hours | Sample Interface Malfunction | Self Corrected |
| SO2 lbs | 4/13/2014 7:00 AM | 11:59 PM | 17 hours | Sample Interface Malfunction | Passed Manual Calibration |
| SO2 lbs | 4/14/2014 12:00 AM | 1:59 PM | 14 hours | Sample Interface Malfunction | Passed Manual Calibration |
| SO2 lbs | 4/14/2014 10:00 PM | 11:59 PM | 2 hours | Sample Interface Malfunction | Self Corrected |
| SO2 lbs | 4/15/2014 12:00 AM | 1:59 AM | 2 hours | Sample Interface Malfunction | Self Corrected |
| SO2 lbs | 4/17/2014 5:00 AM | 6:59 AM | 2 hours | Failed Morning SO2 Zero Calibration Check | Adjusted zero on incinerator SO2 analyzer. Ran validation. |
| SO2 lbs | 4/20/2014 10:00 AM | 2:59 PM | 5 hours | Sample Interface Malfunction - Zinc Cell Heater | Zinc Cell heater was reading low and causing readings to be invalid. Adjusted heater and started working again on 27-Apr-14. |
| SO2 lbs | 4/20/2014 4:00 PM | 6:59 PM | 3 hours | Sample Interface Malfunction - Zinc Cell Heater | Zinc Cell heater was reading low and causing readings to be invalid. Adjusted heater and started working again on 27-Apr-14. |
| SO2 lbs | 4/22/2014 5:00 PM | 6:59 PM | 2 hours | Sample Interface Malfunction - Zinc Cell Heater | Zinc Cell heater was reading low and causing readings to be invalid. Adjusted heater |
| SO2 lbs | 4/28/2014 8:00 AM | 2:59 PM | 7 hours | Sample Interface Malfunction - Zinc Cell Heater | Zinc Cell heater was reading low and causing readings to be invalid. Adjusted heater |
| SO2 lbs | 4/27/2014 11:00 AM | 11:59 AM | 1 hour | Sample Interface Malfunction - Zinc Cell Heater | Zinc Cell heater was reading low and causing readings to be invalid. Adjusted heater. |

| Parameter | Start | End | Duration | Reason | Action |
|----------------|--------------------|----------|-----------|--|---|
| SO2 lbs | 4/29/2014 12:00 AM | 9:59 AM | 10 hours | Sample Interface Malfunction | Changed out sample filter and cleared the alarm on the analyzer. |
| SO2 lbs | 4/29/2014 6:00 PM | 11:59 PM | 6 hours | Sample System Malfunction | Took SO2 out of service to perform testing of the flow system. Waiting on part to fix flow. |
| SO2 lbs | 4/30/2014 12:00 AM | 8:59 AM | 9 hours | Sample System Malfunction | Took SO2 out of service to perform testing of the flow system. Waiting on part to fix flow. |
| SO2 lbs | 5/7/2014 7:00 AM | 8:59 AM | 2 hours | Failed Morning SO2 Span Calibration Check | Ran zero and span calibration and manually adjusted settings. Performed maintenance on unit as well changing out filter. |
| SO2 lbs | 5/29/2014 4:00 PM | 6:59 PM | 3 hours | Sample Filters Plugged after Unit Excursion | Changed Filters |
| SO2 lbs | 6/14/2014 12:00 AM | 1:59 AM | 2 hours | SO2 Analyzer Out-of-Range - Result of Prior Upsets caused by Boilers #1 & #2 Shutdown | Pulled and cleaned filters and tubing. |
| SO2 lbs | 6/14/2014 4:00 AM | 4:59 AM | 1 hour | SO2 Analyzer Out-of-Range - Result of Prior Upsets caused by Boilers #1 & #2 Shutdown | Pulled and cleaned filters and tubing. |
| SO2 lbs | 6/14/2014 5:00 AM | 1:59 PM | 9 hours | Failed Morning SO2 ppm Zero & Span Calibration Check | Changed sample probe filter. Ran Manual Calibration |
| SO2 lbs | 6/15/2014 5:00 AM | 6:59 AM | 2 hours | Failed Morning O2% & SO2 ppm Span Calibration Checks - OOC | Changed sample probe filter. Ran validation on both analyzers. |
| SO2 lbs | 6/30/2014 8:00 AM | 11:59 PM | 16 hours | Analyzer Out of Control - During startup of SRU2 they were running the start gasses thru the incinerator. This was leaving a light coating on the lenses which caused the analyzer to drift towards a negative number. | Cleaned the lenses multiple times and purged the lines but still had problems with the lenses being contaminated. Switching SRU2 to tailgas eliminated the contamination of the lenses. |
| Total duration | | | 132 hours | | |

Comment: Form D - Downtime Summary

Data Sheet for TGTU Incinerator CEM System Cylinder Gas Audit

1. Date Audit Commenced: 6-6-2014 Time Audit Commenced: 1100

2. Audit Gases Used for CGA (All gases to be Protocol 1 Certified):

| Acceptable Audit Gas Ranges | Cylinder Number and Expiration Date | Audit Gas Concentrations | | +/- of Audit Gas Range |
|---|-------------------------------------|--------------------------|-----|------------------------|
| SO ₂ Low: 64-98 ppm 100-150 | EB0038571 | 127.20 | ppm | 39.75% |
| | 3-Mar-22 | | | |
| SO ₂ Mid: 400-400 ppm 250-300 | CC274015 | 270.50 | ppm | 84.53% |
| | 28-Apr-22 | | | |
| O ₂ Low: 4 - 6% by volume | EB0042977 | 4.99 | % | 19.96% |
| | 23-Mar-22 | | | |
| O ₂ Mid: 8 - 12% by volume | CC189312 | 10.01 | % | 40.04% |
| | 23-Mar-22 | | | |

3. CEM System Response:

| | Low-Span NO _x | | Mid-Span NO _x | | Low-Span O ₂ | | Mid-Span O ₂ | |
|------------------------|--------------------------|---------|--------------------------|---------|-------------------------|---------|-------------------------|---------|
| | Analyzer | CeDAR | Analyzer | CeDAR | Analyzer | CeDAR | Analyzer | CeDAR |
| Run 1 | 122.00 | | 268.00 | | 5.64 | | 9.88 | |
| Run 2 | 121.00 | | 270.00 | | 5.88 | | 10.00 | |
| Run 3 | 120.00 | | 266.00 | | 5.83 | | 9.99 | |
| Avg. (d _m) | 121.00 | #DIV/0! | 268.00 | #DIV/0! | 5.72 | #DIV/0! | 9.96 | #DIV/0! |
| A | 4.87% | #DIV/0! | 0.92% | #DIV/0! | 14.56% | #DIV/0! | 0.53% | #DIV/0! |
| Pass? | Yes | #DIV/0! | Yes | #DIV/0! | Yes | #DIV/0! | Yes | #DIV/0! |

4. Signature of Technician(s) performing CGA:



Matt Hobbs, Kevin Marschner and/or Tad Milliken

Calculation of A:

$$A = (d_m - c_a) / c_a \times 100$$

A must be +/-15% to pass.

where:

A = accuracy of CEM

d_m = average of responses

c_a = certified audit value of gas



A DIVISION OF NORCO, INC.

Calibration Gases & Equipment

EPA Protocol Standard Gas Mixture

To:
Norco, Inc
Cheyenne Warehouse
100 S. Greeley HWY
Cheyenne, WY 82007

Report of Analysis and Certification

Manufactured at/by:
EPA Protocol Vendor ID P12013

NorLab Order # 34020710
Customer PO# N/A
Part Number SPG SE1079125PN
Lot Number 4-049-521
Cylinder Number EB0038571

Date Certified: 03/04/14
Cylinder Pressure: 2000 psig @ 70 F
Expiration Date: 03/03/22

| Component(s) | Conc. V/V | ± EPA Uncertainty | Analyzer1 (SO2) | MTO 60a FTIR | | |
|-------------------------|--------------------------|-------------------|-----------------|---------------|-----------|-----------|
| Sulfur Dioxide, ppm | 127.2 | 1.2 | Calibrated: | Assay 1, 2, 3 | 2/12/2014 | 2/12/2014 |
| Nitrogen, O2 Free | | | | | | |
| Reference Standard Data | | | | | | |
| Component | Lot# and XP Date (MM/YR) | ID | Cyl# | Sam# | Conc. | U |
| Sulfur Dioxide, ppm | 8-035-175 XP 3X16 | GMIS1661A | CC 32121 | N/A | 101.9 | 0.82 |
| Traceable Std. / GMIS | 8-126-600 XP 1X17 | SRM 1661A | FF28137 | 84-H-18 | 480.9 | 3.9 |
| Replicate Analysis Data | | | | | | |
| Assay 1 | | Assay 2 | | Assay 3 | | |
| SO2 | | SO2 | | | | |
| 2/25/2014 | | 3/4/2014 | | | | |
| 127.2 | | | | | | |
| 127.4 | | | | | | |
| 127.1 | | | | | | |
| 127.3 | | 127.5 | | | | |
| 0.0 | | 0.0 | | | | |
| 0.0 | | 0.0 | | | | |
| 127.2 | | 127.2 | | | | |

The analysis listed in this report was performed in accordance with the Procedure G1 of the EPA Traceability Protocol, EPA 600/R-12/531 May 2012.

The contents of this cylinder must not be used if the pressure is less than 100 psig.

Analyst:
Aaron Schwenken, Lab Technician

Approved:
Jeff Korn, Quality Assurance Unit



A DIVISION OF NORCO, INC.

Calibration Gases & Equipment

EPA Protocol Standard Gas Mixture

Report of Analysis and Certification

To:
Norco, Inc
Cheyenne Warehouse
100 S. Greeley HWY
Cheyenne, WY 82007

Manufactured at/by:
EPA Protocol Vendor ID P12013

NorLab Order # 34376087
Customer PO# N/A
Part Number SPG 5E1079270PN
Lot Number: 4-105-522
Cylinder Number CC 274015

Date Certified: 04/29/14
Cylinder Pressure: 2000 psig @ 70 F
Expiration Date: 04/28/22

| Component(s) | Conc. V/V | ± EPA Uncertainty | Analyzer1 (SO2) | MTO 60a FTIR | | |
|-------------------------|--------------------------|-------------------|-----------------|---------------|-----------|-----------|
| Sulfur Dioxide, ppm | 270.5 | 1.8 | Calibrated: | Assay 1, 2, 3 | 4/17/2014 | 4/17/2014 |
| Nitrogen, O2 Free | | | | | | |
| Reference Standard Data | | | | | | |
| Component | Lot# and XP Date (MM/YR) | ID | Cy# | Sam# | Conc. | U |
| Sulfur Dioxide, ppm | 2-087-170 XP 6x15 | GMIS 1661a | CC 45427 | 0 | 252.5 | 1.3 |
| Traceable Std If GMIS | 9-128-800 XP 1x17 | SRM 1661a | FF28137 | 94-H-18 | 490.9 | 3.9 |
| Replicate Analysis Data | | | | | | |
| Assay 1 | | Assay 2 | | Assay 3 | | |
| SO2 | | SO2 | | | | |
| 4/22/2014 | | 4/29/2014 | | | | |
| 270.6 | | 270.5 | | | | |
| 271.1 | | 270.5 | | | | |
| 270.2 | | 271.1 | | | | |
| 269.7 | | 270.4 | | | | |
| | | | | | | |
| | | | | | | |
| 270.4 | | 270.6 | | | | |

The analysis listed in this report was performed in accordance with the Procedure G1 of the FPA Traceability Protocol, EPA 600/R-12/531 May 2012.

The contents of this cylinder must not be used if the pressure is less than 100 psig.

Analyst:

Aaron Schwenken, Lab Technician

Approved:

Charles Eckman, Quality Assurance Unit



A DIVISION OF NORCO, INC.

Calibration Gases & Equipment

EPA Protocol Standard Gas Mixture

Report of Analysis and Certification

Manufactured at/by:

EPA Protocol Vendor ID P12013

To:

Norco Inc.

Cheyenne Whse.

100 S. Greeley Hwy.

Cheyenne, WY. 82001

NorLab Order # 34175499

Date Certified: 03/24/14

Customer PO# na

Cylinder Pressure: 2000 psig @ 70 F

Part Number SPG 5B10725VN

Lot Number: 4-072-524

Cylinder Number EB0042977

Expiration Date: 03/23/22

| Component(s) | Conc. V/V | ± EPA Uncertainty | Analyzer1 (O2) | Servomex Paramagnetic Analyzer MTO 97A | | | |
|-------------------|-----------|-------------------|----------------|--|-----------|--|--|
| Oxygen, % | 4.999 | 0.029 | Calibrated: | Assay 1, 2, 3 | 3/24/2014 | | |
| Nitrogen, O2 Free | Balance | | | | | | |

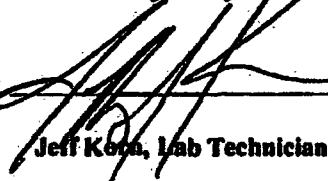
| Reference Standard Data | | | | | | |
|-------------------------|----------------------|------------|------------|---------|-------|-------|
| Component | # and XP Date (MM/Y) | ID | Cy# | Sam# | Conc. | U |
| Oxygen, % | 3-079-181 XP 6X18 | GMIS 2858A | CC 53742 | | 9.913 | 0.043 |
| Traceable Std If GMIS | 0-130-600 6x17 | SRM 2858a | CAL 018848 | 72-D-48 | 9.918 | 0.022 |

| Replicate Analysis Data | | | | | | | |
|-------------------------|--|-----------|--|-----------|--|--|--|
| Assay 1 | | Assay 2 | | Assay 3 | | | |
| Oxygen, % | | Oxygen, % | | Oxygen, % | | | |
| 3/24/2014 | | | | | | | |
| 4.98 | | | | | | | |
| 5.00 | | | | | | | |
| 5.01 | | | | | | | |
| 5.00 | | | | | | | |
| 0.00 | | | | | | | |
| 0.00 | | | | | | | |
| 5.00 | | | | | | | |

The analysis listed in this report was performed in accordance with the Procedure G1 of the EPA Traceability Protocol, EPA 600/R-12/531 May 2012.

The contents of this cylinder must not be used if the pressure is less than 100 psig.

Analyst:


Jeff Koch, Lab Technician

Approved:


Charles Eckman, Quality Assurance Unit



A DIVISION OF NORCO, INC.

Calibration Gases & Equipment
EPA Protocol Standard Gas Mixture

Report of Analysis and Certification

Manufactured at/by:
EPA Protocol Vendor ID P12013

To:
Norco Inc.
Cheyenne Whse.
100 S. Greeley Hwy.
Cheyenne, WY. 341'

NorLab Order # 34175499 Date Certified: 03/24/14
Customer PO# na Cylinder Pressure: 2000 psig @ 70 F
Part Number SPG 5E107210VN
Lot Number: 4-072-523
Cylinder Number CC 189312 Expiration Date: 03/23/22

| Component(s) | Conc. V/V | ± EPA Uncertainty | Analyzer1 (O2) | Servomex Paramagnetic Analyzer MTO 97A | | | |
|-------------------|-----------|----------------------|-------------------|--|-----------|--|--|
| Oxygen, % | 10.01 | 0.047 | Calibrated: | Assay 1; 2; 3 | 3/24/2014 | | |
| Nitrogen, O2 Free | Balance | | | | | | |

| Reference Standard Data | | | | | | | |
|-------------------------|-------------------------|------------|------------|---------|-------|-------|--|
| Component | Lot# and XP Date (MM/Y) | ID | Cyl# | Sam# | Conc. | U | |
| Oxygen, % | 3-078-161 XP 6X18 | GMIS 2658A | CC 53742 | | 9.913 | 0.043 | |
| Traceable Std. to GMIS | 0-130-600 6x17 | SRM 2658a | CAL 018948 | 72-D-46 | 9.918 | 0.022 | |

| Replicate Analysis Data | | | | | | | |
|-------------------------|--|-----------|--|-----------|--|--|--|
| Assay 1 | | Assay 2 | | Assay 3 | | | |
| Oxygen, % | | Oxygen, % | | Oxygen, % | | | |
| 3/24/2014 | | | | | | | |
| 10.00 | | | | | | | |
| 10.02 | | | | | | | |
| 10.01 | | | | | | | |
| 10.01 | | | | | | | |
| 0.00 | | | | | | | |
| 0.00 | | | | | | | |
| | | | | | | | |
| 10.01 | | | | | | | |

The analysis listed in this report was performed in accordance with the Procedure G1 of the EPA Traceability Protocol, EPA 600/R-12/531 May 2012.

The contents of this cylinder must not be used if the pressure is less than 100 psig.

Analyst:

Jeff Kopp, Lab Technician

Approved:

Charles Eckman, Quality Assurance Unit

Attachment G - SRP

Paragraph 217d - SRP Emission Data

| | Actual Emissions | Method of Determination |
|-----|------------------|-------------------------|
| | tons/yr | |
| SO2 | 17.0 | CEMS |

Section H – Additional Miscellaneous Requirements

Additional Miscellaneous Requirements

Frontier Refining LLC
P.O. Box 1588 • Cheyenne, WY 82003-1588

Report Period January 1 – July 31, 2014

| Paragraph | Attachment H - Miscellaneous | Comments |
|-----------|--|--|
| 11 | FRI and FEDRC shall implement programs to reduce NOx emissions from the FCCUs at their respective Covered Refineries, as specified in this Section VI.A. FRI and FEDRC shall incorporate lower NOx emission limits established for their respective Covered Refineries under this Consent Decree into federally enforceable permits and shall each demonstrate future compliance with the lower emission limits through the use of CEMS. | Frontier has submitted a permit application to incorporate Consent Decree conditions. |
| 12 | FRI FCCU NOx Emission Limits. By no later than one hundred and eighty (180) days from the Date of Entry of this Consent Decree, FRI shall notify EPA and the Applicable Intervenor as to which one of the following two options that it shall comply with: a. Paragraph 13 of this Consent Decree; or b. Paragraph 14 of this Consent Decree. | Frontier chose to comply with Paragraph 14. |
| 14 | If FRI elects to comply with Paragraph 12.b above, then FRI shall: | |
| 14a | By no later than one hundred and eighty (180) days from the Date of Entry, comply with interim FCCU NOx concentration emission limits of 60 ppmvd on a 365-day rolling average basis, and 120 ppmvd on a 7-day rolling average basis, both at 0% oxygen; and | Periods of non-compliance with these requirements are found in Attachment B CEMs Data. |
| 14b | By no later than December 31, 2015, comply with FCCU NOx concentration emission limits of 40 ppmvd on a 365-day rolling average basis, and 80 ppmvd on a 7-day rolling average basis, both at 0% oxygen. | Frontier anticipates meeting this requirement at the required time. |
| 17 | At FRI and/or FEDRC, NOx emissions during periods of Startup, Shutdown, or Malfunction of an FCCU controlled by catalyst additives, or NOx emissions during periods of Malfunction of an FCCU, or during periods of Malfunction of a NOx Control Technology used to meet NOx emissions limits required by this Consent Decree, shall not be used in determining compliance with the seven (7)-day rolling average NOx emission limits established pursuant to Paragraphs 11 - 16, provided that during such periods FRI or FEDRC, as appropriate, implements good air pollution control practices to minimize NOx emissions. | Frontier manages the CEMs data appropriately. |
| 18 | Demonstrating Compliance With FCCU Emissions Limits. For each FCCU at FRI and FEDRC, beginning no later than the Date of Entry, FRI and FEDRC shall each use NOx, SO2, CO and O2 CEMS to monitor the performance of their respective FCCUs and to report upon compliance with the terms and conditions of this Consent Decree. CEMS shall be used to demonstrate compliance with the respective NOx emission limits established pursuant to Paragraphs 11 - 16 of this Decree, the SO2 emission limits established pursuant to Paragraphs 19 - 25 of this Decree, and CO emission limits established pursuant to Paragraphs 32 - 35 of this Decree. FRI and FEDRC shall, upon request, each make all CEMS data available to EPA and the Applicable Intervenor. | CEMs have been installed to monitor Nox, SO2, CO and O2. |
| 18a | FRI and FEDRC each shall install, certify, calibrate, maintain, and operate all CEMS required by Paragraph 18 in accordance with the provisions of 40 C.F.R. § 60.13 that are applicable to CEMS (excluding those provisions applicable only to Continuous Opacity Monitoring Systems), 40 C.F.R. Part 60 Appendices A and F, and the applicable performance specification tests of 40 C.F.R. Part 60 Appendix B. | Frontier recently voluntarily disclosed audit findings indicating the QA/QC manuals for the FCCU and SRU CEMs were out-of-date. These manuals have since been updated and submitted to WDEQ. |

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| 18b | Unless 40 C.F.R. Part 60 Appendix F requirements are specifically mandated by Subpart J or the applicable Intervenor, in lieu of the requirements of 40 C.F.R. Part 60, Appendix F §§ 5.1.1, 5.1.3 and 5.1.4, FRI or FEDRC may opt to conduct either a Relative Accuracy Audit ("RAA") or a Relative Accuracy Test Audit ("RATA") on each CEMS at least once every three (3) years. If FRI or FEDRC elect such an option, they must conduct a Cylinder Gas Audit ("CGA") each calendar quarter during which an RAA or RATA is not performed. | RATA tests are conducted annually on the CEMS. |
| B. | SO2 Emissions Reductions From FCCUs | |
| 19 | FRI and FEDRC shall implement those programs identified under this Section VI.B. of this Consent Decree to reduce SO2 emissions from the FRI and FEDRC FCCUs. FRI and FEDRC each shall incorporate lower SO2 emission limits into federally enforceable permits and each shall demonstrate future compliance with the lower emission limits through the use of CEMS. | Frontier has submitted a permit application to incorporate Consent Decree conditions. |
| 20 | FRI FCCU SO2 Emission Limits. By no later than one hundred and eighty (180) days from the Date of Entry, FRI shall notify EPA and the Applicable Intervenor of which one of the following two options that FRI shall comply with: a. Paragraph 21 of this Consent Decree; or b. Paragraph 22 of this Consent Decree. | Frontier chose to comply with Paragraph 22. |
| 22 | If FRI elects to comply with Paragraph 20.b above, then FRI shall: | |
| 22a | By no later than one hundred and eighty (180) days from the Date of Entry, and continuing until FRI begins to comply with Paragraph 22.b., infra, FRI shall add an EPA approved SO2 reducing additive at a rate of 396 pounds per day (based on 10% of total catalyst added to the FCCU for a period from August 2006 to September 2008); and | Catalyst injection rates were less than 396 lbs on 7 days during the reporting period. Also, during the reporting period there was a loss of data capture from 2/4/2014 through 5/5/2014. the FCCU was shut down 11 days during this period and there were no catalyst injections during the outage. |
| 22b | By no later than September 30, 2015, comply with FCCU SO2 concentration emission limit of 25 ppmvd on a 365-day rolling average basis and a FCCU SO2 concentration emission limit of 50 ppmvd on a 7-day rolling average basis, both at 0% oxygen. | Frontier anticipates meeting this requirement at the required time. |
| 22a | If the SO2 Reducing Catalyst Additive addition rate required by this Paragraph 22.a. limits the processing rate or the conversion capability of the FRI FCCU in a manner that cannot be reasonably compensated for by adjustment of other parameters, FRI may, up until 12 months from the Date of Entry, submit a request to EPA to reduce the SO2 Reducing Catalyst Additive addition rate to a level at which the additive no longer causes such limits or effects. Such a request shall include all data that demonstrates the limit on processing rate or conversion capability with evidence that links these limits to the SO2 Reducing Catalyst Additive and that documents all efforts made to compensate by adjustment of other parameters. If EPA provides written approval, FRI may reduce the SO2 Reducing Catalyst Additive addition rate required by this Paragraph 22.a. to the level that EPA allows in its approval. | Frontier did not elect to adjust the catalyst injection rate under this Paragraph. |

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| 24 | Startup, Shutdown, or Malfunction. At FRI and/or FEDRC, SO2 emissions during periods of Startup, Shutdown, or Malfunction of an FCCU or during periods of a Malfunction of an FCCU catalyst additive system or other SO2 emission control device shall not be used by FRI or FEDRC in determining compliance with the 7-day rolling average SO2 emission limits established pursuant to Paragraphs 20 - 25, provided that during such periods FRI and FEDRC, as applicable, implement good air pollution control practices to minimize SO2 emissions. | Frontier manages the CEMs data appropriately. |
| C. | Particulate Matter Emissions Reductions From FCCUs | |
| 26 | FRI and FEDRC shall maintain particulate matter ("PM") emissions from their FCCUs in accordance with the requirements of this Section VI.C. of this Consent Decree and shall incorporate those requirements into federally enforceable permits. | Frontier has submitted a permit application to incorporate Consent Decree conditions. |
| 28 | By the second turnaround of the FRI FCCU or December 31, 2015, whichever occurs first, FRI shall accept and comply with an emission limit of 1.0 pounds of PM per 1,000 pounds of coke burned on a 3-hour average basis. By the second turnaround of the FRI FCCU or December 31, 2015, whichever occurs first, upon prior written notice to EPA pursuant to Section XIX (General Provisions) Paragraph 356 (Notice), FRI may choose to accept and comply with an emission limit of 0.50 pounds of PM per 1,000 pounds of coke burned, in which case FRI shall receive the release from liability provided in Paragraph 331. | Frontier anticipates meeting this requirement at the required time. |
| 29 | PM Testing. To measure PM emissions from their FCCUs, FRI and FEDRC shall each follow the test protocol specified in 40 C.F.R. § 60.106(b)(2) and use EPA Reference Method 5B or 5F to measure PM emissions identified in Paragraphs 26 - 28 from each of their FCCUs. FEDRC shall conduct its first stack test by June 30, 2010 and submit a stack test protocol to the Applicable Intervenor for approval no later than sixty (60) days prior to the stack test. FRI shall conduct its first stack test one hundred and eighty (180) days from the second FCCU turnaround after entry of this Consent Decree but no later than June 30, 2016. FRI shall submit a stack test protocol to the Applicable Intervenor for approval no later than sixty (60) days prior to the stack test. FRI and FEDRC shall thereafter conduct annual stack tests for their FCCUs and include stack test results in the semi-annual reports required under Paragraph 216, Section XI. (Reporting and Record Keeping) of this Consent Decree for the period in which such stack test(s) occurred. Not less than forty-five (45) days before the conduct of any stack test, FRI or FEDRC, shall give notice to EPA and the Applicable Intervenor pursuant to Section XIX.(General Provisions), Paragraph 356 (Notice) of the time and date upon which the test shall be conducted. Within sixty (60) days of completion of any stack test, test reports shall be sent to EPA and the Applicable Intervenor. Upon demonstrating through at least three (3) annual tests that a particular FCCU's PM limits are not being exceeded, FRI or FEDRC, as appropriate, may request EPA approval to conduct these stack tests less frequently than annually at such FCCU. | This requirement does not apply until after the Dec. 31, 2015 compliance deadline for the FCCU PM emission reductions. |
| 30 | Neither FRI nor FEDRC shall use PM emissions during periods of Startup, Shutdown, or Malfunction of an FCCU or Malfunction of a PM control device to determine compliance with the emission limits established in Paragraphs 27 and 28 provided that during such periods FRI or FEDRC, as applicable, implement good air pollution control practices to minimize PM emissions. | This requirement does not apply until after the Dec. 31, 2015 compliance deadline for the FCCU PM emission reductions. |

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| 31 | Opacity Monitoring At FCCUs. FRI, by June 30, 2015, and FEDRC, by December 31, 2009, shall each install and operate a Continuous Opacity Monitoring System ("COMS") to monitor opacity at each of the Covered Refineries' FCCUs. If Wet Gas Scrubber(s) are installed at either Covered Refinery, FRI and FEDRC, as applicable, shall operate the Wet Gas Scrubber(s) pursuant to an EPA-approved Alternative Monitoring Plan for opacity. FRI and FEDRC, as appropriate, shall install, certify, calibrate, maintain, and operate all COMS required by this Consent Decree in accordance with 40 C.F.R. §§ 60.11, 60.13 and Part 60 Appendix A, and the applicable performance specification test of 40 C.F.R. Part 60 Appendix B. | This requirement does not apply until June 30, 2015. A PM CEM is currently in place on the FCCU stack, and an AMP is in place addressing the PM CEM use in place of the COM. |
| D | CO Emissions Reductions From FCCUs | |
| 32 | FRI and FEDRC shall operate the FCCUs at the Covered Refineries in a manner that minimizes CO emissions and shall reduce emissions further at each FCCU in accordance with the requirements of this Section VI.D of this Consent Decree. FRI and FEDRC shall incorporate the requirements of this Section VI.D. into federally enforceable permits for their respective Covered Refineries. | Frontier has submitted a permit application to incorporate Consent Decree conditions. |
| 33 | FRI CO Emissions Limits. By no later than the Date of Entry of this Consent Decree, the FRI FCCU shall meet an emission limit of 500 ppmvd CO corrected to 0% O ₂ on a 1-hour block average basis and 100 ppmvd CO corrected to 0% O ₂ on a 365-day rolling average basis. | Periods of non-compliance with these requirements are found in Attachment B CEMs Data. |
| 35 | CO emissions during periods of Startup, Shutdown, or Malfunction of an FCCU or Malfunction of a CO control device shall not be used in determining compliance with the emission limit of 500 ppmvd CO corrected to 0% O ₂ on a 1-hour average basis, provided that during such periods FRI or FEDRC, as appropriate, implement good air pollution control practices to minimize CO emissions. | Frontier manages the CEMs data appropriately. |
| E | NSPS Applicability to FCCU Regenerators. | |
| 36 | FRI FCCU Catalyst Regenerators. By no later than the dates specified below for each pollutant, the FRI FCCU Catalyst Regenerator shall be an "affected facility," as defined in 40 C.F.R. § 60.2, under NSPS Subpart J, and shall comply with the applicable requirements of NSPS Subparts A and J for each of the following pollutants by the specified dates: SO ₂ September 30, 2015; PM September 30, 2015; and CO Date of Entry. | Frontier has submitted a permit application to incorporate Consent Decree conditions. |
| 38 | For FCCU Catalyst Regenerators that become "affected facilities," as defined in 40 C.F.R. § 60.2, under NSPS Subpart J pursuant to this Section VI.E., entry of this Consent Decree and compliance with the relevant monitoring requirements of this Consent Decree at the Covered Refineries' FCCUs shall satisfy the notice requirements of 40 C.F.R. § 60.7(a) and the initial performance test requirement of 40 C.F.R. § 60.8(a). a. If prior to the termination of this Consent Decree, the FCCU becomes subject to NSPS Subpart Ja for a particular pollutant due to a "modification" (as that term is defined in the final Subpart Ja rule), the modified affected facility shall be subject to and comply with NSPS Subpart Ja in lieu of NSPS, Subpart J for that regulated pollutant to which a standard applies as a result of the modification. b. If prior to the termination of this Consent Decree, the FCCU becomes subject to NSPS Subpart Ja due to a "reconstruction" (as that term is defined in the final Subpart Ja rule), the reconstructed facility shall be subject to and comply with NSPS Subpart Ja for all pollutants in lieu of Subpart J. | The FCCU has not triggered NSPS Ja. |
| F | NO_x Emission Reductions From Heaters and Boilers | |

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| 40 | FRI and FEDRC shall each implement programs to reduce NOx emissions from refinery heaters and boilers at their respective Covered Refineries to meet the requirements of Paragraphs 42, 45 and 46 through the installation of NOx controls and the acceptance of federally enforceable permit emission limits on the units controlled, or the shut down of certain units. Further, at their respective Covered Refineries, FRI and FEDRC shall monitor compliance with the emission limits through stack testing, use of CEMS, or PEMS. | Per the Nox Control Plan, the CO Boiler was permanently shut down on Dec. 22, 2013. Frontier has met this requirement. |
| 41 | Installation of NOx Control Technology. For each Covered Refinery, FRI and FEDRC shall select one or any combination of the following "Qualifying Controls" to satisfy the requirements of Paragraphs 42, 45 and 46: a. SCR or SNCR; b. Current Generation or Next Generation Ultra-Low NOx Burners; c. Other technologies or combination of technologies which FRI or FEDRC, as appropriate, demonstrates to EPA's satisfaction shall reduce NOx emissions to 0.040 lbs. per mmBTU or lower; or d. Permanent shutdown of a heater or boiler with revocation of its federally enforceable operating permit. | Per the Nox Control Plan, the CO Boiler will be permanently shut down and the permit revoked by Dec. 31, 2013. Frontier has met this requirement. |
| 42 | On or before December 31, 2013, for each Covered Refinery, FRI and FEDRC shall use Qualifying Controls to reduce the aggregate NOx emissions (i.e. combined NOx emissions of both Covered Refineries) from the Heaters and Boilers listed in Appendix A by at least 649 tons per year, so as to satisfy the following inequality: $n \sum [(E_{\text{actual}})_i - (E_{\text{allowable}})_i] \leq 649 \text{ tons of NOx per year}$ $i = 1 \text{ Where: } (E_{\text{allowable}})_i = [(\text{The permitted allowable pounds of NOx per million BTU for heater or boiler } i, \text{ or, the requested portion of the permitted reduction pursuant to Paragraph 213(a) } / (2000 \text{ pounds per ton})] \times [(\text{the lower of permitted or maximum heat input rate } 33 \text{ capacity in million BTU per hour for heater or boiler } i) \times (\text{the lower of 8760 or permitted hours per year})]$ $(E_{\text{actual}})_i = \text{The tons of NOx per year prior actual emissions during calendar years 2003 and 2004 (unless prior actual emissions exceed allowable emissions, then use allowable) as shown in Appendix A for heater or boiler } i \text{ and } n = \text{The number of heaters and boilers with Qualifying Controls from those listed in Appendix A that are selected by FRI or FEDRC, as appropriate, to satisfy the requirements of the equation set forth in this Paragraph 42 of this Consent Decree. Federally enforceable permit limits established to implement this Paragraph 42 may use a 365 - day rolling average for heaters and boilers that use a CEMS or PEMS to monitor compliance.}$ | Per the Nox Control Plan, the CO Boiler will be permanently shut down and the permit revoked by Dec. 31, 2013. Frontier has met this requirement. |
| 45 | By December 31, 2009, FRI and FEDRC each shall install at their respective Covered Refineries Qualifying Controls and have by December 31, 2009 also applied for emission limits from the appropriate permitting authority sufficient to achieve, in the aggregate, two-thirds of the NOx emissions reductions required by Paragraph 42. No later than March 31, 2010, FRI and FEDRC shall each provide to EPA and the Applicable Intervenor a report showing how they have satisfied the requirement of this Paragraph 45 at their respective Covered Refineries. | The Nox Control Plan identifies dates of Nox emission reductions and identifies how the aggregate two-thirds reduction was accomplished by Dec. 31, 2009. |
| 46 | By no later than December 31, 2013, heaters and boilers with Qualifying Controls shall represent at least 30% of the total maximum heat input capacity or, if less, the allowable heat input capacity, as shown in Appendix A, of all heaters and boilers greater than 40 mmBTU/hr at each Covered Refinery. Any Qualifying Controls can be used to satisfy this requirement, regardless of when the Qualifying Controls were installed. | The Nox Control Plan identifies dates of Nox emission reductions and identifies how the 30% requirement was accomplished by Dec. 31, 2013. |

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| 47 | Beginning no later than one hundred and eighty (180) days after installing Qualifying Controls on and commencing operation of a heater or boiler that shall be used to satisfy the requirements of Paragraphs 42, 45, and 46, at each Covered Refinery FRI and FEDRC shall monitor the heaters or boilers as follows: | See below |
| 47a | For heaters and boilers with a capacity greater than 150 mmBTU/hr (HHV), install or continue to operate a NOx CEMS; | No applicable sources. |
| 47b | For heaters and boilers with a capacity greater than 100 mmBTU/hr (HHV) but less than or equal to 150 mmBTU/hr (HHV), install or continue to operate a NOx CEMS, or monitor NOx emissions with a predictive emissions monitoring system ("PEMS") developed and operated pursuant to the requirements of Appendix B (Predictive Emissions Monitoring Systems for Heaters and Boilers with Capacities Between 100 and 150 Mmbtu/hr) of this Consent Decree; | No applicable sources. |
| 47c | For heaters and boilers with a capacity of less than or equal to 100 mmBTU/hr (HHV), conduct an initial performance test and any periodic tests that may be required by EPA or by the applicable State or local permitting authority under other applicable regulatory authority. FRI and FEDRC shall report the results of the initial performance testing at their respective Covered Refinery to EPA and the Applicable Intervenor; | No applicable sources. |
| 47d | FRI and FEDRC shall use Method 7E in conjunction with Method 19 or an EPA-approved alternative test method to conduct initial performance testing for NOx emissions required by Subparagraph 47.c. Monitoring with a PEMS that is required by this Paragraph shall be conducted in accordance with the requirements of Appendix B. Units with Qualifying Controls installed before the Date of Entry that are subject to this Paragraph shall comply with this Paragraph by Date of Entry; and | No applicable sources. |
| 47e | Any heater or boiler included in Appendix A that (i) already had Qualifying Controls installed prior to January 1, 2003, and (ii) is used solely to meet the heat input capacity requirement in Paragraph 46, shall install CEMS by December 31, 2013. | The Crude Charge Heater is covered by this requirement. Frontier has met this requirement by the required date. |
| 48 | Beginning no later than one hundred and eighty (180) days after installing Qualifying Controls and commencing operation of a heater or boiler that shall be monitored by use of a NOx CEMS that is required by Paragraph 47, at their respective Covered Refineries, FRI and FEDRC shall each install, certify, calibrate, maintain, and operate these CEMS in accordance with the provisions of 40 C.F.R. § 60.13 that are applicable to CEMs (excluding those provisions applicable only to Continuous Opacity Monitoring Systems) and Part 60 Appendices A and F, and the applicable performance specification test of 40 C.F.R. Part 60 Appendix B. Unless Appendix F requirements are specifically required by NSPS or state regulations, with respect to 40 C.F.R. Part 60, Appendix F, in lieu of the requirements of 40 C.F.R. Part 60, Appendix F §§ 5.1.1, 5.1.3 and 5.1.4, FRI and/or FEDRC, as appropriate, must conduct either a Relative Accuracy Audit ("RAA") or a Relative Accuracy Test Audit ("RATA") on each CEMS at least once every three (3) years. At their respective Covered Refinery, FRI and FEDRC each shall conduct a Cylinder Gas Audit ("CGA") each calendar quarter during which a RAA or a RATA is not performed. | Frontier currently has no sources subject to this and anticipates meeting this requirement at the required time. |

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| 50 | For their respective Covered Refineries, FRI and FEDRC shall retain all records required to support their reporting requirements under this Section VI.F. this Consent Decree 38 until termination of this Consent Decree, Section XX. (Termination). Upon request, FRI and FEDRC shall submit said records to EPA or the Applicable Intervenor. | Records required to support this section are maintained as required. |
| G | SO2 Emissions Reductions from and, NSPS Applicability to, Heaters and Boilers and Other Specified Equipment. | |
| 53 | NSPS Applicability to Heaters and Boilers and Other Specified Equipment. | |
| 53a | Upon the Date of Entry, all heaters and boilers at each Covered Refinery shall be "affected facilities" as defined by 40 C.F.R. § 60.2 under NSPS Subpart J, and shall comply with the applicable requirements of NSPS Subparts A and J for fuel gas combustion devices, except for those heaters and boilers listed in Appendix C, which shall be "affected facilities" as defined by 40 C.F.R. § 60.2, and shall be subject to and comply with the applicable requirements of NSPS Subparts A and J for fuel gas combustion devices by the dates listed in Appendix C. | All heaters and boilers listed in Appendix C are affected facilities under NSPS Subparts A and J. |
| 53b | Upon the Date of Entry all equipment listed in Appendix D shall be "affected facilities" as defined by 40 C.F.R. § 60.2, under NSPS Subpart J, and shall comply with the applicable requirements of NSPS Subparts A and J for fuel gas combustion devices by the dates listed in Appendix D. | All heaters and boilers listed in Appendix D are affected facilities under NSPS Subparts A and J. |
| 53c | Where Appendix C or D specifies an alternative monitoring plan ("AMP") submittal date (rather than a final NSPS Subpart J compliance date), FRI and FEDRC shall submit to EPA and the Applicable Intervenor a timely and complete AMP application. Such an AMP may be based on alternative monitoring for H2S or SO2. If an AMP is not approved, FRI and/or FEDRC, as appropriate, shall, within ninety (90) days of receiving notice of such disapproval submit to EPA for approval, and send a copy to the Applicable Intervenor, a plan and schedule that provide for compliance with the monitoring requirements of NSPS Subpart J in accordance with the schedules contained in Appendices C and D. The plan may include a revised AMP application, physical or operational changes to the equipment, or additional or different monitoring. | An AMP for an inherently-low sulfur stream at the Butamer unit was filed prior to the revisions to J/Ja exempting those streams. No action has been taken by EPA on this AMP at this time. A different AMP was filed and approved for flares in Appendix D. |
| 53f | If prior to the termination of this Consent Decree, any heater, boiler or other specified equipment becomes subject to NSPS Subpart Ja for a particular pollutant due to a "modification" (as that term is defined in the final Subpart Ja rule), the modified affected facility shall be subject to and comply with NSPS Subpart Ja in lieu of NSPS Subpart J for that regulated pollutant to which a standard applies as a result of the modification. | No heaters or boilers identified in Appendix C have triggered NSPS Ja. |
| 53g | If prior to the termination of this Consent Decree, any heater, boiler or other specified equipment becomes subject to NSPS Subpart Ja due to a "reconstruction" (as that term is defined in the final Subpart Ja rule), the reconstructed facility shall be subject to and comply with NSPS Subpart Ja for all pollutants in lieu of Subpart J. | No heaters or boilers identified in Appendix C have triggered NSPS Ja. |

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| 54 | Elimination/Reduction of Fuel Oil Burning. Effective on the Date of Entry, neither FRI nor FEDRC shall burn Fuel Oil in any Combustion Unit at their respective Covered Refineries except that: a. Either FRI or FEDRC may burn Fuel Oil at their respective Covered Refineries during periods of Natural Gas Curtailment, test runs, and operator training; and b. Either FRI or FEDRC may burn Torch Oil in FCCU regenerators at their respective Covered Refineries to assist in starting, restarting, hot standby, or to maintain regenerator heat balance. | No fuel oils burning occurs other than those identified in 54a and 54b. |
| H | Sulfur Recovery Plants | |
| 56 | Claus Sulfur Recovery Plant NSPS Applicability. Upon the Date of Entry of this Consent Decree, the FRI SRP and the FEDRC SRP shall continue to be "affected facilities," as defined by 40 C.F.R. § 60.2, under NSPS, 40 C.F.R. Part 60, Subparts A and J and shall, except as provided below in Paragraphs 57, 57.a. and 57.b., comply with all provisions applicable to such an "affected facility" as defined in 40 C.F.R. Part 60, Subparts A and J. | The SRP is an affected facility under NSPS Subparts A and J. |
| 56a | Except as provided in Paragraph 58 of this Consent Decree, the FRI SRP shall fully comply with all provisions under NSPS, 40 C.F.R. Part 60, Subparts A and J, in effect on the Date of Entry, including periods of TGTU maintenance turnarounds; and | Excess emissions are included in Attachment G CEMs information. |
| 56c | If prior to the termination of this Consent Decree, a SRP becomes subject to NSPS Subpart Ja for a particular pollutant due to a "modification" (as that term is defined in the final Subpart Ja rule), the modified affected facility shall be subject to and comply with NSPS Ja in lieu of NSPS Subpart J for that regulated pollutant to which a standard applies as a result of the modification. | The SRP has not triggered NSPS Ja. |
| 56d | If prior to the termination of this Consent Decree, a SRP becomes subject to NSPS Subpart Ja due to a "reconstruction" (as that term is defined in the final Subpart Ja rule), the reconstructed facility shall be subject to and comply with NSPS Ja for all pollutants in lieu of Subpart J. | The SRP has not triggered NSPS Ja. |
| 57 | Claus Sulfur Recovery Plant NSPS Compliance. Except as provided for the two scheduled tail gas unit maintenance turnarounds set forth in Paragraphs 58 and 59 below, the FRI and FEDRC SRPs shall comply with all applicable provisions of NSPS set forth at 40 C.F.R. Part 60, Subparts A and J, including, but not limited to, the following: | See below |
| 57a | Emission Limit. FRI and FEDRC shall, for all periods of operation of the SRPs at the Covered Refineries, comply with 40 C.F.R. § 60.104(a)(2) at each SRP except during periods of Startup, Shutdown, or Malfunction of that SRP, or during a Malfunction of a TGTU serving as a control device for that SRP. For the purpose of determining compliance with the Sulfur Recovery Plant emission limits of 40 C.F.R. § 60.104(a)(2), the "Startup/Shutdown" provisions set forth in NSPS Subpart A shall apply to each SRP and not to the independent start-up or shutdown of a TGTU serving as a control device for that SRP. However, the Malfunction exception set forth in NSPS Subpart A, 40 C.F.R. § 60.8 shall apply to each SRP and to the TGTU serving as the control device for that SRP. | Excess emissions are included in Attachment G CEMs information. |

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| 57b | Monitoring. At their respective refineries, FRI and FEDRC shall monitor tail gas emissions points (stacks) for tail gas emissions and shall report excess emissions from each of these emissions points as required by 40 C.F.R. §§ 60.7(c), 60.13, and 60.105(a)(5), (6) or (7). FRI and FEDRC shall monitor emissions from their respective SRPs with CEMS at all of the emission points, unless an SO ₂ alternative monitoring procedure has been approved by EPA, per 40 C.F.R. § 60.13(i.), for any of the emission points. The requirement for continuous monitoring of the SRP emission points is not applicable to the Acid Gas Flaring Devices used to flare the Acid Gas or Sour Water Stripper Gas diverted from the SRPs. | Monitoring of the tail gas emissions is conducted per these requirements. |
| 58 | Interim SRP Requirements For The FRI TGTU Maintenance Turnarounds. FRI shall implement the following interim measures at the FRI SRP for any two maintenance turnarounds of the existing TGTU scheduled between June 30, 2008 and March 31, 2016: | Frontier has one of the maintenance turnarounds to date. Frontier anticipates complying with this when required. ✓ |
| 58a | FRI shall monitor the emissions from the FRI Claus Trains during the TGTU maintenance turnaround in accordance with 40 C.F.R. Part 60, Subpart A, § 60.13 or other EPA approved alternative monitoring plan. | Frontier has had one of the maintenance turnarounds to date. Frontier anticipates complying with this when required. ✓ |
| 58b | By no later than one hundred and eighty (180) days after Date of Entry, FRI shall complete an optimization study, or submit a copy of a recent optimization study, to identify ways to minimize emissions and maximize sulfur recovery efficiencies at FRI SRU No.1 and SRU No.2 and shall submit a copy of that study to EPA and WDEQ. This study shall meet the requirements set forth in Paragraph 60 (Optimization). FRI shall promptly implement the physical improvements and operating parameters recommended in the study to optimize performance of FRI SRU No. 1 and SRU No. 2 during TGTU maintenance turnarounds in accordance with the schedule submitted under Paragraph 58.c, as applicable. | Optimization study has been completed. The study recommendations have been completed |
| 58c | By no later than ninety (90) days after completion of the optimization study in Paragraph 58.b above, FRI shall submit a report to EPA and WDEQ that proposes an appropriate interim performance standard (percent recovery efficiency and/or emission limitation) and, if necessary, a schedule for implementing related optimization study recommendations that are necessary to comply with FRI's proposed interim standard. Beginning with the date of such submission, FRI shall comply with its proposed interim performance standard and, if necessary, its proposed optimization study implementation schedule during TGTU turnarounds. | Optimization study has been completed. The study recommendations have been completed. |

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| 58d | <p>If, within thirty (30) days of receipt of the report required under Subparagraph 58.c., EPA, after consultation with WDEQ, determines that a more stringent interim performance standard and/or a different implementation schedule is appropriate and can be achieved with a reasonable certainty of compliance, EPA shall notify FRI of its determination. Unless FRI disputes EPA's determination(s) within ninety (90) days of FRI's receipt of EPA's notice, FRI shall, within that ninety (90) day period, comply with such new interim performance standard and/or a different implementation schedule or, if necessary, such other period as may be established by EPA based upon the approved implementation schedule. FRI shall comply with the appropriate interim performance standard for the two scheduled TGTU maintenance turnarounds that occur prior to March 31, 2016.</p> | <p>Optimization study has been completed. The study recommendations have been completed.</p> |
| 60 | <p>Optimization. Each optimization study required for SRPs at FRI or FEDRC under Paragraph 58.b. or Paragraph 59.b of this Consent Decree shall: a. contain a detailed evaluation of plant design and capacity, operating parameters and efficiencies - including catalytic activity, and material balances; b. contain an analysis of the composition of the acid gas and sour water stripper gas resulting from the processing of crude slate actually used, or expected to be used, in those Claus trains; c. contain a review of each critical piece of process equipment and instrumentation within the Claus train that is designed to correct deficiencies or problems that prevent the Claus train from achieving its optimal sulfur recovery efficiency and expanded periods of operation; d. establish baseline data through testing and measurement of key parameters throughout the Claus train; e. establish a thermodynamic process model of the Claus train; f. for any key parameters that have been determined to be at less than optimal levels, identify each change necessary to move such parameters toward their optimal values and a schedule for the implementation of those change(s); g. verify through testing, analysis of continuous emission monitoring data or other means, of incremental and cumulative improvements in sulfur recovery efficiency, if any; h. establish new operating procedures, if needed, for long-term efficient operation; and i. be conducted to optimize the performance of the Claus trains in light of the actual characteristics of the feeds to the trains.</p> | <p>The optimization plan contained the necessary information.</p> |
| 61 | <p>Sulfur Pit Emissions. FRI and FEDRC shall continue to route or re-route all sulfur pit emissions at their respective refineries so that sulfur pit emissions are eliminated, controlled, or included and monitored as part of the SRPs' emissions subject to the NSPS Subpart J limit for SO₂, 40 C.F.R. § 60.104(a)(2).</p> | <p>Sulfur pit vents are routed to the TGTU incinerator.</p> |

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| 62 | <p>62. Good Operation and Maintenance. By no later than two hundred and seventy (270) days after the Date of Entry of this Consent Decree, FRI and FEDRC shall submit to EPA and the Applicable Intervenor a summary of the plans, implemented or to be implemented, at the their respective refineries for enhanced maintenance and operation of the FRI and FEDRC SRPs and the appropriate Upstream Process Units. The plans shall be entitled "Preventive Maintenance and Operation Plan" ("PMO Plan"). The PMO Plan shall be a compilation of approaches for exercising good air pollution control practices and for minimizing SO2 emissions from sulfur processing through applying good operating practices at the sulfur processing equipment and other production processes at the Covered Refineries. PMO Plans shall have as their goals the elimination of Acid Gas Flaring and the minimization of emissions from SRPs between scheduled maintenance turnarounds. The PMO Plan shall include as appropriate, but not be limited to: a. sulfur shedding procedures; b. Startup and Shutdown procedures for SRPs; c. control devices and Upstream Process Units; d. emergency procedures and schedules to coordinate maintenance turnarounds of the SRPs' Claus trains; and e. any control devices to coincide with scheduled turnarounds of major Upstream Process Units.</p> | The PMO plan was developed and submitted as required. |
| 62 | <p>At their respective Covered Refineries, FRI and FEDRC shall implement the PMO Plans at all times, including periods of Startup, Shutdown, upset, and Malfunction of its SRPs. Changes to a PMO Plan related to minimizing Acid Gas Flaring and/or SO2 emissions shall be summarized and reported by FRI and FEDRC to EPA and the Applicable Intervenor in the semi-annual report required under Paragraph 216.</p> | The PMO plan was implemented at all times during the reporting period. |
| I | Hydrocarbon Flaring | |
| 65 | <p>NSPS Applicability to Hydrocarbon Flaring Devices. FRI and FEDRC, at their respective Covered Refineries, own and operate the Hydrocarbon Flaring Devices identified in Appendix G to this Consent Decree. FRI and FEDRC agree that each Hydrocarbon Flaring Device identified in Appendix G shall be an "affected facility," as that term is used in NSPS, 40 C.F.R. Part 60, and shall be subject to and required to comply with, the requirements of 40 C.F.R. Part 60, Subparts A and J, for fuel gas combustion devices used as emergency control devices for the quick and safe release of gases. FRI and FEDRC shall by the dates specified in Appendix G meet the NSPS Subparts A and J requirements for each Hydrocarbon Flaring Device identified in Appendix G. FRI and FEDRC shall achieve compliance with Subparts A and J requirements for each Hydrocarbon Flaring Device identified in Appendix G through the use of one or any combination of the following methods identified in Subparagraphs 65.a. - 65.e.:</p> | See below |
| 65a | <p>Operating and maintaining a flare gas recovery system to prevent continuous or routine combustion in the Hydrocarbon Flaring Device. Use of a flare gas recovery system on a flare obviates the need to continuously monitor emissions as otherwise required by 40 C.F.R. § 60.105(a)(4);</p> | Flare gas recovery compressors are utilized on portions of the flares. Those streams which are managed by the compressors are considered to be covered by this requirement. |

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| 65b | Eliminating the routes of continuous or intermittent, routinely-generated refinery fuel gases to an Hydrocarbon Flaring Device and operating the Flaring Device such that it receives only non-routinely generated gases, process upset gases, fuel gas released as a result of relief valve leakage or gases released due to other Malfunctions; | Frontier is currently conducting a voluntary audit of sources to the flare and has preliminarily identified some minor intermittent or low flow streams which potentially may not be characterized as process upset gases. |
| 65c | Operating the Hydrocarbon Flaring Device as a fuel gas combustion device, monitoring it for the continuous or intermittent, routinely-generated refinery fuel gas streams put into the flare header, with a CEMS as required by 40 C.F.R. § 60.105(a)(4) or with a parametric monitoring system approved by EPA as an alternative monitoring system under 40 C.F.R. § 60.13(i.) and complying with emission limits when and as required by Paragraph 68.a.; or | Frontier operates the Main Plant Flare as a fuel gas combustion device, however all of the streams which require monitoring which are covered by an AMP are currently being reviewed |
| 65d | d. During the term of this Consent Decree eliminate to the extent practicable routes of continuous or intermittent routinely generated fuel gases to a Flaring Device and monitor the mass flow of sulfur dioxide emitted by use of a CEMS and flow meter; provided however, that this compliance method may not be used unless FRI and/or FEDRC, as appropriate: i. demonstrates to EPA and the Applicable Intervenor that the Flaring Device in question emits less than 500 pounds per day of SO2 under normal conditions; and by the dates specified in Appendix G; ii. secures EPA and the Applicable Intervenor's approval for use of this method as the selected compliance method; and iii. uses this compliance method for only one of the Flaring Devices listed in Appendix G at each Covered Refinery; | Frontier does not utilize this option. |
| 65e | FRI and/or FEDRC may submit to EPA and the Applicable Intervenor a timely and complete application for an Alternative Monitoring Plan ("AMP") for a Flaring Device listed in Appendix E and Appendix G, by the applicable date listed in those appendices (rather than a final NSPS Subpart J compliance date). Such an AMP may be based on alternative monitoring for H2S or SO2. If an AMP is not approved by EPA, FRI and/or FEDRC, as appropriate, shall, within ninety (90) days of receiving notice of such disapproval submit to EPA for approval, with a copy to the Applicable Intervenor, a plan and schedule that provide for compliance with the monitoring requirements of NSPS Subpart J in accordance with the schedules contained in Appendices E and G. Such plan may include a revised AMP application, physical or operational changes to the equipment, or additional or different monitoring. | Frontier does not utilize this option. |

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| 65f | For Flaring Devices that combust low-flow VOC streams from vents, pump seals, and other sources, it is anticipated that some of the AMP applications shall rely in part on calculating a weighted average H2S concentration of all VOC and fuel gas streams that are burned in a single Flaring Device and demonstrating with alternative monitoring that either the SO2 emissions from the Flaring Device shall not exceed 20 ppm or that the weighted average H2S concentration is not likely to exceed 162 ppm H2S. EPA shall not reject an AMP solely due to the AMP's use of one of these approaches to demonstrating compliance with NSPS Subpart J. | Frontier does not utilize this option. |
| 65g | If prior to the termination of this Consent Decree, a Flaring Device becomes subject to NSPS Subpart Ja for a particular pollutant due to a "modification" (as that term is defined in the final Subpart Ja rule), the modified affected facility shall be subject to and comply with NSPS Subpart Ja in lieu of NSPS, Subpart J for that regulated pollutant to which a standard applies as a result of the modification. | The flares are now subject to NSPS Ja as modified flares. |
| 65h | If prior to the termination of this Consent Decree, a Flaring Device becomes subject to NSPS Subpart Ja due to a "reconstruction" (as that term is defined in the final Subpart Ja rule), the reconstructed facility shall be subject to and comply with NSPS Subpart Ja for all pollutants in lieu of Subpart J. | The flares did not trigger the reconstruction definition of NSPS Ja. |
| 66 | At their respective Covered Refineries, FRI and FEDRC shall implement the compliance option chosen for each Hydrocarbon Flaring Device according to the schedule in Appendix G and identify the option that was implemented for each Hydrocarbon Flaring Device in the first Semi-Annual Report due under Paragraph 216 after such compliance option is chosen. The Parties recognize that periodic maintenance may be required for properly designed and operated flare gas recovery systems. At their respective Covered Refineries, FRI and FEDRC shall take all reasonable measures to minimize emissions while such periodic maintenance is being performed on any flare gas recovery system installed. FRI may request from WDEQ permission to temporarily operate the Old Flare (identified in Appendix G) at the FRI Refinery for only those periods of maintenance scheduled for the Main Flare. During such periods of operation, FRI must operate the Old Flare in compliance with NSPS Subpart J. | The Old Flare was not utilized during this reporting period. |
| 67 | Within one hundred and eighty (180) days after bringing an Hydrocarbon Flaring Device into compliance with 40 C.F.R. Part 60, Subparts A and J, at their respective Covered Refineries, FRI and FEDRC shall conduct a flare performance test pursuant to 40 C.F.R. § 60.18, or an EPA-approved equivalent method. In lieu of conducting the velocity test required in 40 C.F.R. § 60.18, FRI and FEDRC may submit velocity calculations to EPA and the Applicable Intervenor which demonstrate that the NSPS Hydrocarbon Flaring Device meets the performance specification required by 40 C.F.R. § 60.18. Operation of an adequately sized flare gas recovery unit that recovers all routine continuous and intermittent gases sent to the flare obviates the need to conduct a performance test pursuant to methods in 40 C.F.R. 60.18(f) on the associated flare(s). | The required information has previously been submitted. |

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| 68 | Compliance With the Emissions Limit at 40 C.F.R. § 60.104(a)(1). a. Continuous or Intermittent, Routinely-Generated Refinery Fuel Gases. For continuous or intermittent, routinely-generated refinery fuel gases that are combusted in any of the NSPS Hydrocarbon Flaring Devices at their respective Covered Refineries, FRI and FEDRC shall comply with the emission limit at 40 C.F.R. § 60.104(a)(1) by the dates specified in Appendix G. b. Non-Routinely Generated Gases. The combustion of gases generated by the Startup, Shutdown, or Malfunction of a refinery process unit or released to an NSPS Flaring Device as a result of relief valve leakage or other Malfunction is exempt from the requirement to comply with 40 C.F.R. § 60.104(a)(1). | Frontier is currently conducting a voluntary audit of sources to the flare and has preliminarily identified some minor intermittent or low flow streams which potentially may not be characterized as process upset gases. |
| J | Control of Acid Gas Flaring and Tail Gas Incidents | |
| 71 | Investigation and Reporting. Commencing upon the Date of Entry and thereafter, no later than sixty (60) days following the end of any Acid Gas Flaring Incident, at their respective Covered Refineries, FRI and FEDRC shall conduct an investigation into the root cause(s) of the incident and record the findings of the investigation in a report (the "Incident Report"). Each Incident Report shall be included in the Semi-Annual Report required by Paragraph 84. The Incident Report for each incident shall include the following: | Incident Reports have been completed for all acid gas and tail gas flaring incidents during the reporting period. |
| 72 | Corrective Action. In response to any AG Flaring Incident occurring after the Date of Entry, at their respective Covered Refineries, FRI and FEDRC shall take, as expeditiously as practicable, such interim and/or long-term corrective actions, if any, as are consistent with good engineering practice to minimize the likelihood of a recurrence of the Root Cause and all significant contributing causes of that AG Flaring Incident. | Information on corrective actions is included in the Incident Reports. |
| 72a | After a review of any report required to be prepared by Paragraph 71 and submitted to EPA and the Applicable Intervenor as required by Paragraph 84, EPA shall notify FRI and/or FEDRC, as applicable, in writing of (1) any deficiencies in the corrective action(s) listed in the findings and/or (2) any objections to the schedule(s) of implementation, and explain the basis for EPA's objection(s). FRI and/or FEDRC, as applicable, will implement an alternative or revised corrective action or implementation schedule based on EPA's comments. If a corrective action that EPA has identified as deficient is already completed, then FRI and/or FEDRC, as applicable, is not obligated to implement the corrective action identified by EPA for that Flaring Incident. However, FRI and/or FEDRC, as applicable, will be put on notice that such corrective action is deficient and not acceptable for remedying any subsequent, similar root cause(s) of any incident. | No deficiencies have been identified by EPA/WDEQ on incident reports |

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| 78 | In the event a dispute under Paragraphs 74 through 77 is brought to the Court pursuant to the Dispute Resolution provisions of this Consent Decree, Section XVII. (Retention of Jurisdiction/Dispute Resolution), FRI and/or FEDRC, as appropriate, may also assert a Startup, Shutdown and/or upset defense (including an individual sulfur recovery unit within an SRP), but the United States shall be entitled to assert that such defenses are not available. If FRI, or FEDRC, as appropriate, prevails in persuading the Court that the defenses of Startup, Shutdown and/or upset are available for AG Flaring Incidents under 40 C.F.R. § 60.104(a)(1), FRI, or FEDRC, as appropriate, shall not be liable for stipulated penalties for emissions resulting from such Startup, Shutdown and/or upset. If the United States prevails in persuading the Court that the defenses for Startup, Shutdown and/or upset are not available, FRI or FEDRC, as appropriate, shall be liable for such stipulated penalties. | No disputes arose during the reporting period. |
| 79 | Other than for a Malfunction or force majeure, if no Acid Gas Flaring Incident occurs at either the FEDRC or FRI Refinery for a rolling 36-month period, then the stipulated penalty provisions of Paragraph 254 of Section XIII. (Stipulated Penalties) shall no longer apply to that refinery. EPA may elect to reinstate the stipulated penalty provision if such refinery has an Acid Gas Flaring Incident that would otherwise be subject to stipulated penalties. EPA's decision shall not be subject to dispute resolution. Once reinstated, the stipulated penalty provision shall continue for the remaining life of this Consent Decree for that Covered Refinery. | Frontier is not utilizing this option. |
| 80 | Emissions Calculations. | See below |
| 80a | Calculation of the Quantity of Sulfur Dioxide Emissions Resulting from AG Flaring. For purposes of this Consent Decree, FRI and FEDRC shall calculate the quantity of SO ₂ emissions resulting from an AG Flaring Incident by applying the following formula: $\text{Tons of SO}_2 = [\text{FR}][\text{TD}][\text{ConcH}_2\text{S}][8.44 \times 10^{-5}]$ The quantity of SO ₂ emitted shall be rounded to one decimal point. (Thus, for example, for a calculation that results in a number equal to 10.050 tons, the quantity of SO ₂ emitted shall be rounded to 10.1 tons.) For purposes of determining the occurrence of, or the total quantity of SO ₂ emissions resulting from, an AG Flaring Incident that consists of intermittent AG Flaring, the quantity of SO ₂ emitted shall be equal to the sum of the quantities of SO ₂ flared during each 24-hour period starting when the Acid Gas was first flared. | Acid gas flaring events are calculated and reported in Attachment C Flaring |
| 80b | Calculation of the Rate of SO ₂ Emissions During AG Flaring. For purposes of this Consent Decree, the rate of SO ₂ emissions resulting from an AG Flaring Incident shall be expressed in terms of pounds per hour and shall be calculated by the following formula: $\text{ER} = [\text{FR}][\text{ConcH}_2\text{S}][0.169]$ The emission rate shall be rounded to one decimal point. (Thus, for example, for a calculation that results in an emission rate of 19.95 pounds of SO ₂ per hour, the emission rate shall be rounded to 20.0 pounds of SO ₂ per hour; for a calculation that results in an emission rate of 20.05 pounds of SO ₂ per hour, the emission rate shall be rounded to 20.1.) | Acid gas flaring events are calculated and reported in Attachment C Flaring |

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| 82 | <p>Tail Gas Incidents: Investigation, Reporting, Corrective Action and Stipulated Penalties. For Tail Gas Incidents, FRI and/or FEDRC, as appropriate, shall follow the same investigative, reporting, corrective action and assessment of stipulated penalty procedures as those set forth in Paragraphs 71 through 79 for Acid Gas Flaring Incidents. Those procedures shall be applied to TGTU shutdowns, bypasses of a TGTU, or other events which result in a Tail Gas Incident, including unscheduled Shutdowns of a Claus Sulfur Recovery Plant.</p> <p>Notwithstanding the foregoing, during the interim periods identified in Paragraphs 58 and 59, stipulated penalties shall not apply to a Tail Gas Incident attributable to the scheduled Startup or Shutdown of an individual train at the FRI SRP or at the FEDRC SRP, provided that FRI and/or FEDRC, as appropriate, demonstrate in their Tail Gas Incident Report that they have implemented good air pollution control practices. This Paragraph 82 shall apply without the exemption from stipulated penalties for all Tail Gas Incidents that occur after the effective dates of full NSPS applicability for SRPs, as provided in Paragraph 56 above.</p> | Tail Gas incidents are investigated and reported in Attachment C Flaring |
| 83 | <p>Calculation of the Quantity of SO₂ Emissions Resulting From A Tail Gas Incident. For the purposes of this Consent Decree, the quantity of SO₂ emissions resulting from a Tail Gas Incident shall be calculated by one of the following methods, based on the type of event: a. If Tail Gas is combusted in a flare, the SO₂ emissions are calculated using the methods outlined in Paragraph 80; or b. If Tail Gas exceeding the 250 ppmvd (NSPS J limit) is emitted from a monitored SRP incinerator, then the following formula applies: $ERTGI = \sum [FRI_{inc}]_i [Conc. SO_2 - 250]_i [0.169 \times 10^{-6}] TD_i TGI \Sigma = 1209209 \cdot \% O_2$ Where: ERTGI = Emissions from Tail Gas Unit at the SRP incinerator, pounds of SO₂ over a 24 hour period TDTGI = Hours when the incinerator CEM was exceeding 250 ppmvd SO₂ on a rolling twelve hour average, corrected to 0% O₂, in each 24 hour period of the Incident i = Each hour within TDTGI FRI_{inc} = Incinerator Exhaust Gas Flow Rate (standard cubic feet per hour, dry basis) (actual stack monitor data or engineering estimate based on the acid gas feed rate to the SRP) for each hour of the Incident Conc. SO₂ = The average SO₂ concentration (CEMS data) that is greater than 250 ppm in the incinerator exhaust gas, ppmvd corrected to 0% O₂, for each hour of the Incident % O₂ = O₂ concentration (CEMS data) in the incinerator exhaust gas in volume % on dry basis for each hour of the Incident $0.169 \times 10^{-6} = [1.0 \text{ lb mole of } SO_2 / 379 \text{ } SO_2] [64 \text{ lbs } SO_2 / 1.0 \text{ lb mole } SO_2] [1 \times 10^{-6}]$ Standard conditions = 60 degree F; 14.7 lbforce/sq.in. absolute In the event the concentration SO₂ data point is inaccurate or not available or a flow meter for FRI_{inc} does not exist or is inoperable, then either FRI or FEDRC, as applicable, shall estimate emissions based on best engineering judgment.</p> | Emissions are calculated using the pounds/hour output from the CEM and subtracting the SRP SO ₂ permit limit. Going forward, Frontier will utilize the equations in paragraph 83. |
| K | Control of Hydrocarbon Flaring Incidents | |
| L | Benzene Waste NESHAP Program Enhancements | |

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| 86 | At each of the Covered Refineries, FRI and FEDRC agree to comply with all applicable requirements of 40 C.F.R. Part 61, Subpart FF ("Benzene Waste Operations NESHAP" or "Subpart FF" or "BWON") and to undertake the measures set forth in this Section VI.L. for ensuring future compliance with Subpart FF and minimizing or eliminating fugitive benzene waste emissions. | Frontier recently voluntarily disclosed audit findings indicating various deficiencies in the BWON program. The specific issues related to Consent Decree items are identified below. |
| 88 | 88. FRI Refinery Compliance Status Changes. FRI has reported a Total Annual Benzene ("TAB") of less than 10 Mg/yr. If at any time from the Date of Entry of this Consent Decree through its termination, FRI is determined to have a TAB equal to or greater than 10 Mg/yr, FRI shall utilize the appropriate compliance option specified below. a. If the TAB exceeds 10 Mg/yr based on errors, omissions, or mischaracterization of waste streams existing at the refinery as of the Date of Entry, FRI shall utilize the compliance option set forth at 40 C.F.R. § 61.342(e) (the "6 BQ compliance option"). b. If the TAB exceeds 10 Mg/yr based on increased throughput/capacity expansion, FRI may select either the 2 Mg or 6 BQ compliance option. | Frontier determined the facility TAB was over 10 Mg/yr, and is complying with the 6BQ compliance option. |
| 89 | FRI shall consult with EPA and the Applicable Intervenor before making any change in compliance strategy required by Paragraph 88. All changes must be undertaken in accordance with the regulatory provisions of the BWON. | No change in compliance status occurred during this reporting period. |
| 90 | 90. One-Time Review and Verification of Each Covered Refinery's TAB: Phase One of the Review and Verification Process. By no later than 12 months after the Date of Entry, FRI and FEDRC shall complete a Phase One review and verification of each Covered Refinery's TAB and compliance with the 2 Mg compliance option at the FEDRC Refinery. For each Covered Refinery, the Phase One review and verification process shall include, at a minimum: a. an identification of each waste stream as defined in Subpart FF that is required to be included in the Covered Refinery's TAB; b. a review and identification of the calculations and/or measurements used to determine the flows of each waste stream for the purpose of ensuring the accuracy of the annual waste quantity for each waste stream; c. an identification of the benzene concentration in each waste stream. FRI and FEDRC shall be required to sample for benzene concentration at no less than ten (10) waste streams per Covered Refinery consistent with the requirements of 40 C.F.R. § 61.355(c)(1) and (3). FRI and FEDRC may use previous analytical data or documented knowledge of waste streams in accordance with 40 C.F.R. § 61.355(c)(2) for any remaining waste streams not sampled; and d. an identification of whether or not the waste stream is controlled consistent with the requirements of Subpart FF. | Previously submitted. |
| 91 | Phase One Report. By no later than fifteen (15) months after Date of Entry FRI and FEDRC shall submit to EPA and the Applicable Intervenor a BWON Compliance Review and Verification Report for their respective Covered Refinery that sets forth the results of Phase One, including but not limited to the items identified in (a) through (d) of Paragraph 90. | Previously submitted. |

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| 92 | <p>One-Time Review and Verification of Each Covered Refinery's TAB: Phase Two of the Review and Verification Process. Based on EPA's review of the BWON Compliance Review and Verification Reports and after an opportunity for consultation with the Applicable Intervenor, EPA may select up to twenty (20) additional waste streams at each Covered Refinery for sampling for benzene concentration. At their respective Covered Refinery, FRI and FEDRC shall conduct the required sampling and submit the results to EPA within sixty (60) days of receipt of EPA's request. FRI and FEDRC shall use the results of this additional sampling to reevaluate the TAB and the uncontrolled benzene quantity and to amend the BWON Compliance Review and Verification Report, as needed. To the extent that EPA requires FRI and FEDRC to sample a waste stream as part of the Phase Two review that FRI and/or FEDRC sampled and included as part of its Phase One review, each may average the results of such sampling at their respective Covered Refinery. FRI and FEDRC shall submit an amended BWON Compliance Review and Verification Report within one-hundred twenty (120) days following the date of the completion of the required Phase Two sampling, if Phase Two sampling is required by EPA. This amended BWON Compliance Review and Verification Report shall supercede and replace the originally-submitted BWON Compliance Review and Verification Report. If Phase Two sampling is not required by EPA, the originally-submitted BWON Compliance Review and Verification Report shall constitute the final report.</p> | Previously submitted. |
| 93 | <p>Amended TAB Reports. If the results of the BWON Compliance Review and Verification Report indicate that a Covered Refinery's TAB report filed most recently before this Consent Decree does not satisfy the requirements of Subpart FF, the Covered Refinery shall submit, by no later than one-hundred twenty (120) days after completion of the BWON Compliance Review and Verification Report, an amended TAB report to EPA. The BWON Compliance Review and Verification Report submitted by FRI and/or FEDRC, as appropriate, shall be deemed an amended TAB report for purposes of Subpart FF reporting to EPA.</p> | Previously submitted. |
| 94 | <p>Implementation of Actions Necessary to Correct Non-Compliance: FRI. If the results of the BWON Compliance Review and Verification Report indicate that FRI has a TAB of over 10 Mg/yr, FRI shall submit to EPA, by no later than one-hundred eighty (180) days after completion of the BWON Compliance Review and Verification Report, a Compliance Plan that identifies with specificity: a. the actions it shall take to ensure that the FRI's TAB remains below 10 Mg/yr for 2009 and each calendar year thereafter; or b. a compliance strategy and schedule that FRI shall implement to ensure that FRI complies with the 6 BQ or the 2Mg compliance option as soon as practicable but by no later than December 31, 2010, if it cannot ensure a consistent TAB below 10 Mg/yr.</p> | Previously submitted. |

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| 96 | Implementation of Actions Necessary to Correct Non-Compliance: Review and Approval of Plans. Any plans submitted pursuant to Paragraphs 94 and 95 shall be subject to the approval of, disapproval of, or modification by EPA, after an opportunity for consultation with the Applicable Intervenor. Within sixty (60) days after receiving any notification of disapproval or request for modification from EPA, FRI and/or FEDRC, as appropriate, shall submit to EPA and the Applicable Intervenor a revised plan that responds to all identified deficiencies. Unless EPA disapproves or requests modifications of the revised plan within sixty (60) days, FRI and/or FEDRC, as appropriate, shall implement its proposed plan. | EPA did not disapprove or request a modification of the plan. |
| 97 | Implementation of Actions Necessary to Correct Non-Compliance: Certification of Compliance. By no later than thirty (30) days after completion of the implementation of all actions, if any, required pursuant to Paragraphs 94 and 95 to come into compliance with the applicable compliance option, FRI and FEDRC shall for their respective Covered Refinery submit, pursuant to Paragraph 139 of this Consent Decree, their certifications and a report, pursuant to Section XIX (General Provisions), Paragraph 356 (Notice), to EPA and the Applicable Intervenor that such refinery complies with the BWON. | Previously submitted. |
| 101 | Prohibition of Use of Single Canisters. Except as expressly allowed in Paragraph 105, FRI and FEDRC shall not use single carbon canisters for any new units or installations that require vapor control pursuant to the BWON at any of their Covered Refineries. | Frontier does not currently utilize single canisters. |
| 102 | Definition of "Breakthrough" in Dual Canister Systems. For dual carbon canister systems in series and depending upon the parameter that FRI and/or FEDRC decide to monitor, "breakthrough" between the primary and secondary canister shall be defined as any reading equal to or greater than either 50 ppm VOC or 5 ppm benzene. | Frontier utilizes a breakthrough definition of 50 ppm VOC. |
| 103 | Monitoring for Breakthrough in Dual Canister Systems. By the later of either the Date of Entry or seven (7) days after the installation of any new dual canister, FRI and FEDRC shall start to monitor for Breakthrough between the primary and secondary carbon canisters at times when there is actual flow into the carbon canister, in accordance with the frequency specified in 40 C.F.R. § 61.354(d), and shall monitor the outlet of the secondary canister on a monthly basis or at its design replacement interval (whichever is less) to verify the proper functioning of the system. | Frontier recently voluntarily disclosed audit findings indicating monitoring had not been conducted per these requirements. Monitoring is now conducted per this requirement. |
| 104 | Replacing Canisters in Dual Canister Systems. FRI and FEDRC shall replace each original primary carbon canister (or route the flow to an appropriate alternative control device) immediately when any Breakthrough is detected. The original secondary carbon canister shall become the new primary carbon canister and a fresh carbon canister shall become the secondary canister unless both the primary and secondary carbon canisters are replaced. For purposes of this Paragraph, "immediately" shall mean within twenty-four (24) hours. As an alternative, FRI and FEDRC may continue to operate the dual carbon canister system after Breakthrough is detected provided VOC monitoring is conducted at the outlet of the secondary carbon canister on a daily basis. If any VOC reading is detected at the outlet of the secondary carbon canister, both canisters must be replaced within twelve (12) hours. | Frontier recently voluntarily disclosed audit findings indicating replacement had not been conducted per these requirements. Replacement of dual canisters now occurs per this requirement. |

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| 105 | Limited Use of Single Canisters. FRI and FEDRC may utilize properly sized single canisters for short-term operations such as with temporary storage tanks or as temporary control devices. For canisters operated as part of a single canister system, Breakthrough is defined for purposes of this Decree as any reading of VOC or benzene above background. Beginning no later than the Date of Entry, FRI and FEDRC shall monitor for Breakthrough from each single carbon canister each day there is actual flow to the carbon canister. | Frontier does not currently utilize single canisters. |
| 106 | Replacing Canisters in Single Canister Systems. FRI and FEDRC shall replace each single carbon canister with a fresh carbon canister, discontinue flow, or route the stream to an alternate, appropriate device immediately when any Breakthrough is detected. For this Paragraph, "immediately" shall mean within eight (8) hours for canisters of 55 gallons or less and within twenty-four (24) hours for canisters greater than 55 gallons. If flow to a single canister is discontinued under this Paragraph, such canister may not be placed back into BWON vapor control service until it has been appropriately regenerated or replaced. | Frontier does not currently utilize single canisters. |
| 107 | Maintaining Canister Supplies. At their respective Covered Refineries, FRI and FEDRC shall maintain a supply of fresh activated carbon canisters at all times. | Frontier maintains a supply of fresh activated carbon at all times. |
| 108 | Records Relating to Canisters. FRI and FEDRC shall maintain records for the requirements of Paragraphs 98 - 107 in accordance with 40 C.F.R. § 61.356(j)(10). Additionally, all VOC and/or benzene measurements used to calculate removal efficiencies through control carbon canisters shall be maintained in a logbook or electronic database. The date, time, monitoring instrument type, instrument reading, and canister location shall be maintained in the logbook or database. | Frontier recently voluntarily disclosed audit findings indicating records had not been maintained as required. Records are now maintained as directed by this requirement. |
| 109 | Annual Review. By no later than sixty (60) days after Date of Entry, at their respective Covered Refineries, FRI and FEDRC shall modify existing Management of Change ("MOC") procedures or develop a new program to annually review process and project information for each Covered Refinery, including but not limited to construction projects, to ensure that all new benzene waste streams are included in each Covered Refinery's waste stream inventory during the life of this Consent Decree. | Frontier recently voluntarily disclosed audit findings indicating previous reviews were not as comprehensive as they could have been. An annual review was conducted prior to the submission of the BWON annual report this year. |
| 112 | Until this Consent Decree is terminated, FRI and FEDRC shall conduct subsequent audits of each of their respective laboratories used for BWON analyses at least once every two years. | Audits are conducted every two years. The last audit was completed August 2013. |
| 114 | Benzene Spills. Beginning no later than the Date of Entry, at their respective Covered Refineries, FRI and FEDRC shall continue to review spills to determine whether more than ten (10) pounds of benzene waste was generated in any twenty-hour (24) hour period at either Covered Refinery. FRI and FEDRC shall continue to include the benzene generated by such spills in the TAB and in the uncontrolled benzene quantity calculations for each Covered Refinery in accordance with the applicable compliance option as required by Subpart FF. | Benzene spills are evaluated per this requirement. |

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| 118 | <p>Wastes Subject to Subpart FF: Schematics. By no later than one hundred and eighty (180) days after the Date of Entry, FRI and FEDRC shall each submit to EPA and the Applicable Intervenor schematics for their respective Covered Refineries that: a. depict the waste management units (including sewers) that handle, store, and transfer wastes subject to Subpart FF; b. identify the control status of each waste management unit; and c. show how such waste is transferred within the Covered Refinery. FRI and FEDRC shall include with the schematics a quantification of all uncontrolled wastes subject to Subpart FF. If requested by EPA, FRI and/or FEDRC, as appropriate, shall submit to EPA within ninety (90) days of the request, revised schematics regarding the characterization of these wastes and the appropriate control standards.</p> | <p>Previously Submitted. As part of the recent audit and work following, Frontier has done a thorough review of the BWON system and is in the process of determining how the schematic needs to be updated. After it is determined how to update the schematic to properly reflect operations, it will be submitted.</p> |
| 119 | <p>Wastes Subject to Subpart FF: Non-Aqueous Benzene Waste Streams. By Date of Lodging, all waste management units at each Covered Refinery handling non-exempt, non-aqueous benzene wastes, as defined in Subpart FF, shall meet the applicable control standards of Subpart FF.</p> | <p>Frontier recently voluntarily disclosed audit findings indicating that this requirement was not being met. Non-Aqueous Benzene Wastes are now managed per this requirement.</p> |
| 120 | <p>Wastes Subject to Subpart FF: Aqueous Benzene Waste Streams. For purposes of calculating each Covered Refinery's TAB pursuant to the requirements of 40 C.F.R. § 61.342(a), FRI and FEDRC shall include all wastes subject to Subpart FF that become "aqueous" until such streams are recycled to a process or put into a process feed tank (unless the tank is used primarily for the storage of wastes). Appropriate adjustments shall be made to such calculations to avoid the double-counting of benzene. For purposes of complying with the 2 Mg or 6 BQ compliance option, by Date of Lodging, all waste management units at each Covered Refinery handling BWON waste streams either shall meet the applicable control standards of Subpart FF or shall have their uncontrolled benzene quantity count toward the applicable 2 Mg or 6 BQ limit.</p> | <p>Aqueous Benzene Wastes are managed per this requirement.</p> |
| 121 | <p>BWON Sampling Plans: General. By no later than the completion of the BWON training specified in Paragraph 115, FRI and FEDRC shall each submit to EPA and the Applicable Intervenor, for approval, BWON Sampling Plans for their respective Covered Refineries to describe the sampling of BWON streams that FRI and FEDRC shall undertake to estimate quarterly and annual TABs (for FRI) or quarterly and annual uncontrolled benzene quantities for Covered Refineries with a TAB greater than or equal to 10 Mg/yr (for FEDRC and FRI if and when FRI's TAB exceeds 10 Mg/yr).</p> | <p>A plan was previously submitted. As part of the recent audit and work following, Frontier has done a thorough review of the BWON Sampling Plan and is in the process of determining how the plan needs to be updated. After it is determined how to update the plan, it will be submitted and implemented.</p> |

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| 122 | 122. BWON Sampling Plans: Content Requirements. For a Covered Refinery with a TAB less than 10 Mg/yr, the Sampling Plan shall identify: a. annually, each waste stream that has contributed 0.05 Mg/yr or more at the point of generation to the previous year's TAB calculations; and b. quarterly, the proposed End-of-Line ("EOL") sampling locations and methods for flow calculations to be used in calculating projected quarterly and annual TAB calculations under the terms of Paragraph 129. | A plan was previously submitted. As part of the recent audit and work following, Frontier has done a thorough review of the BWON Sampling Plan and is in the process of determining how the plan needs to be updated. After it is determined how to update the plan, it will be submitted and implemented. |
| 127 | BWON Sampling Plans: Timing for Implementation. At their respective Covered Refineries, FRI and FEDRC shall implement the sampling required under their Sampling Plan during the first full calendar quarter after they submit that plan. FRI and FEDRC shall, at their respective Covered Refinery, continue to implement the Sampling Plan: a. unless and until EPA disapproves the plan; or b. unless and until FRI and/or FEDRC modifies a plan, with EPA's approval, under Paragraph 128. | Implemented as required. |
| 128 | BWON Sampling Plans: Modifications. | |
| 128a | Changes in Processes, Operations, or Other Factors. If changes in processes, operations, or other factors lead FRI and/or FEDRC to conclude that a Sampling Plan for a Covered Refinery may no longer provide an accurate basis for estimating that Covered Refinery's quarterly or annual TABs or benzene quantities under Paragraph 129, then by no later than ninety (90) days after FRI and/or FEDRC, as appropriate, determine that the plan no longer provides an accurate measure, they shall submit to EPA and the Applicable Intervenor a revised Sampling Plan for EPA approval. In the first full calendar quarter after submitting the revised plan, FRI and/or FEDRC, as appropriate shall implement the revised plan. FRI and/or FEDRC, as appropriate, shall continue to implement the revised plan unless and until EPA disapproves the revised plan after an opportunity for consultation with the Applicable Intervenor. | As part of the recent audit and work following, Frontier has done a thorough review of the BWON Sampling Plan and is in the process of determining how the plan needs to be updated. After it is determined how to update the plan, it will be submitted and implemented. |
| 128b | Requests for Modifications. After two (2) years of implementing a Sampling Plan, FRI and/or FEDRC, as appropriate, may submit a request to EPA for approval, with a copy to the Applicable Intervenor, to revise a Covered Refinery's sampling plan, including sampling frequency. EPA shall not unreasonably withhold its consent. FRI and FEDRC shall not implement any proposed revisions under this Subparagraph until EPA provides its approval after an opportunity for consultation with the Applicable Intervenor. | Frontier has not requested a modification to the sampling plan requirements. |
| 129 | Quarterly and Annual Estimations of TABs and Uncontrolled Benzene Quantities. At the end of each calendar quarter and based on sampling results and approved flow calculations, FRI and FEDRC shall calculate a quarterly and projected annual: a. TAB for each Covered Refinery with a TAB less than 10 Mg/yr; and b. uncontrolled benzene quantity for each Covered Refinery with a TAB greater than or equal to 10 Mg/yr. | Frontier calculates these values and reports them as required. See Attachment A for details. |

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| 131 | Corrective Measures: Basis. Except as set forth in Paragraph 132, FRI and FEDRC shall implement corrective measures specified in Paragraph 133 of this Consent Decree at the applicable Covered Refinery if: | No corrective measures are required to be reported during this reporting period. |
| 131c | For any Covered Refinery with a TAB greater than or equal to 10 Mg/yr and electing the 6 BQ compliance option, the quarterly uncontrolled benzene quantity equals or exceeds 1.5 Mg or the projected annual uncontrolled benzene quantity equals or exceeds 6 Mg for the then-current compliance year. | No corrective measures are required to be reported during this reporting period. |
| 132 | Exception to Implementing Corrective Measures. If, at their respective Covered Refineries, FRI and/or FEDRC can identify the reason(s) in any particular calendar quarter that the quarterly and projected annual calculations result in benzene quantities in excess of those identified in Paragraph 133 and state that they do not expect such reason or reasons to recur, then FRI and/or FEDRC, as appropriate, may exclude the benzene quantity attributable to the identified reason(s) from the projected calendar year quantity. EPA and the Applicable Intervenor may dispute any determination made by FRI or FEDRC. If that exclusion results in no potential violation of the BWON, FRI and/or FEDRC, as appropriate, shall not be required to implement corrective measures under Paragraph 131, and may exclude the uncontrolled benzene attributable to the identified reason(s) in determining the applicability of Paragraph 133. At any time that either FRI or FEDRC proceeds under this Paragraph, they shall describe how they have satisfied the conditions in this Paragraph in the reports due under Section XI. (Reporting and Record Keeping) of this Decree. | No corrective measures are required to be reported during this reporting period. |
| 133 | Compliance Assurance Plan - Corrective Measures. If at their respective Covered Refineries, FRI and/or FEDRC meets one or more conditions in Paragraph 131 (except as provided under Paragraph 132), then by no later than sixty (60) days after the end of the calendar quarter in which one or more of the conditions were met, FRI and/or FEDRC, as appropriate, shall submit a Compliance Assurance Plan to EPA for approval, with a copy to the Applicable Intervenor. In that Compliance Assurance Plan, FRI and/or FEDRC shall identify the quantity and cause(s) of the potentially-elevated benzene quantities, all corrective measures that they have taken or plan to take to ensure that the cause(s) shall not recur, and the schedule of actions that they shall take to ensure that the subject refinery complies with the BWON for the calendar compliance year. At their respective Covered Refinery, FRI and/or FEDRC shall implement the plan unless and until EPA disapproves after an opportunity for consultation with the Applicable Intervenor. | No corrective measures are required to be reported during this reporting period. |

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| 134 | <p>Third-Party Assistance. If the projected annual benzene quantity under Paragraph 129 exceeds, in two consecutive quarters, 10 Mg/yr for a Covered Refinery subject to Paragraph 131.a, 2 Mg/yr for a Covered Refinery subject to Paragraph 131.b, or 6 Mg/yr for a Covered Refinery subject to Paragraph 131.c., and FRI and/or FEDRC cannot identify the reason for the exceedances as allowed under Paragraph 132, they shall within thirty (30) days retain a third-party contractor during the following quarter to undertake a TAB study and compliance review at that Covered Refinery. By no later than ninety (90) days after they receive the results of the third-party TAB study and compliance review, FRI and/or FEDRC, as appropriate, shall submit such results and a plan and schedule for remedying any deficiencies identified in the third-party study and compliance review to EPA and the Applicable Intervenor. At their respective Covered Refinery, FRI and FEDRC shall implement their proposed plan unless and until EPA disapproves after an opportunity for consultation with the Applicable Intervenor. By no later than thirty (30) days after completion of the implementation of all actions, if any, required to come into compliance with the applicable compliance option, FRI and FEDRC shall submit their respective certifications, pursuant to Paragraph 139 of this Consent Decree, and a report, pursuant to Section XIX (General Provisions), Paragraph 356 (Notice), to EPA and the Applicable Intervenor that such Covered Refinery complies with the BWON.</p> | No corrective measures are required to be reported during this reporting period. |
| 135 | Miscellaneous Measures. | |
| 135a | For the FRI Refinery, by no later than the date FRI submits a Compliance Plan under Paragraph 94.a, FRI shall: | |
| 135a.i | Conduct monthly visual inspections of all Subpart FF water traps within the FRI Refinery's individual drain systems; | Frontier recently voluntarily disclosed audit findings indicating these inspections previously were not complete. Monthly visual inspections of all Subpart FF water traps are now being conducted. |
| 135a.ii | On a weekly basis, visually inspect all Subpart FF conservation vents on process sewers for detectable leaks; reset any vents where leaks are detected; and record the results of the inspections. After two (2) years of weekly inspections, and based upon an evaluation of the recorded results, FRI may submit a request to the Applicable EPA Region to modify the frequency of the inspections. EPA shall not unreasonably withhold its consent. Nothing in this Subparagraph shall require FRI to monitor conservation vents on fixed roof tanks. Alternatively, for conservation vents with indicators that identify whether flow has occurred, FRI may elect to visually inspect such indicators on a monthly basis and, if flow is then detected, FRI shall then visually inspect that indicator on a weekly basis for four (4) weeks. If flow is detected during any two (2) of those four (4) weeks, FRI shall install a carbon canister on that vent until appropriate corrective action(s) can be implemented to prevent such flow; | Frontier recently voluntarily disclosed audit findings indicating these inspections previously were not complete. Monthly visual inspections of all Subpart FF water traps are now being conducted. |

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| 135a.iii | Conduct quarterly monitoring of the controlled oil-water separators in benzene service in accordance with the "no detectable emissions" provision in 40 C.F.R. § 61.347, or quarterly measurements of the oil-water separator seal gap if using the alternative control requirements allowed under 40 C.F.R. § 61.352, if the separator is a control device under Subpart FF; and | Frontier recently voluntarily disclosed audit findings indicating these inspections previously were not complete. Quarterly inspection of controlled oil-water separators in benzene service are now being conducted. |
| 135a.iv | Continue to manage all groundwater remediation wastes that are covered by Subpart FF at the FRI Refinery in appropriate waste management units under and as required by the BWON. | As part of the recent voluntary audit and work following, Frontier has determined the groundwater remediation sump is not a controlled WMU. Frontier included the uncontrolled emissions in the 6BQ calculations. An action plan is currently being developed to control the groundwater remediation wastes. |
| 136 | Reporting and Record Keeping Requirements for this Section VI.L. Outside of the Reports Required under 40 C.F.R. § 61.357 or under the Progress Report Procedures of Section XI (Reporting and Record Keeping). At the times specified in the applicable provisions of this Section VI.L. for their respective Covered Refineries, FRI and FEDRC shall submit, as and to the extent required, copies of the following reports to EPA and the Applicable Intervenor: | Previously submitted. |
| 136a | A BWON Compliance Review and Verification Report, Paragraph 90, as amended, if necessary, by Paragraph 92; | Previously submitted. |
| 136b | An Amended TAB Report, if necessary (Paragraph 93); | Previously submitted. |
| 136c | A Plan for the FRI Refinery to come into compliance with the 6 BQ or the 2Mg compliance option if and when FRI discovers that its TAB equals or exceeds 10 Mg/yr through the BWON Compliance Review and Verification Report (Paragraph 94), or through sampling (Paragraph 133); | Previously submitted. |
| 136d | A compliance certification, if necessary (Paragraph 97); | Previously submitted. |
| 136f | Schematics of Subpart FF waste movements (Paragraph 118), as revised, if necessary; | Previously submitted. |
| 136g | Sampling Plans (Paragraph 121), and revised Sampling Plans, if necessary (Paragraph 128); and | Previously submitted. |
| 136h | A Compliance Assurance Plan to ensure that uncontrolled benzene does not equal or exceed, as applicable, 6 BQ or 2 Mg/yr (Paragraph 133). | Not required. |

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| 138 | At any time after two years of reporting pursuant to the requirements of Paragraphs 136 and 137, FRI or FEDRC may submit a request to EPA to modify the reporting frequency for any or all of the reporting categories. This request may include a request to report the previous year's projected calendar year TAB and uncontrolled benzene quantity in the Part XI report due on February 28th of each year, rather than semi-annually on February 28th and August 31st of each year. FRI and FEDRC shall not change the due dates for their reports under Paragraphs 136 and 137 unless and until EPA approves their request after an opportunity for consultation with the Applicable Intervenor. | Frontier has not requested a modification of the reporting requirements. |
| 139 | Certifications Required in Section VI.L. Certifications required under this Section shall include the following statement: I certify under penalty of law that this information was prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my directions and my inquiry of the person(s) who manage the system, or the person(s) directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete | Certifications are included as required. |
| M | Leak Detection and Repair ("LDAR") Program Enhancements | |
| 142 | FRI - Affected Facilities. Upon the Date of Entry, all equipment, as defined by 40 C.F.R. § 60.591, within each process unit and all compressors at FRI shall become "affected facilities" for purposes of 40 C.F.R. Part 60, Subpart GGG, and shall become subject to and comply with the requirements of 40 C.F.R. Part 60, Subpart GGG, and the requirements of Section VI.M. of this Consent Decree. | All process units are affected facilities under NSPS Subparts A and GGG. |

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| 144 | <p>144. Written Refinery-Wide LDAR Program. No later than one-hundred and eighty (180) days after the Date of Entry FRI and FEDRC shall for each Covered Refinery develop and maintain a written refinery-wide program for compliance with all applicable federal and state LDAR regulations. FRI and FEDRC shall implement this program on a refinery-wide basis and update such program as may be necessary to ensure continuing compliance through and after termination of this Consent Decree. The refinery-wide program shall include at a minimum:</p> <p>a. A facility-wide leak rate goal that includes specific process-unit leak rate goals that shall be targets for achievement; b. An identification of all equipment in light liquid and/or in gas/vapor service in each of the Covered Refineries that has the potential to leak VOCs, HAPs, VHAPs, and benzene; c. Procedures for identifying leaking equipment within process units in each of the Covered Refineries; d. Procedures for repairing and keeping track of leaking equipment; e. Procedures (e.g., a Management of Change program) to ensure that components subject to LDAR requirements that are added to each facility during scheduled maintenance and construction activities are integrated into the LDAR program; f. A process for evaluating new and replacement LDAR equipment that includes active consideration of equipment or techniques that shall minimize leaks and/or eliminate chronic leakers; and g. A definition of "LDAR Personnel" and a process for accountability, identifying for each facility the person or position that shall be the "LDAR Coordinator." Consistent with FRI and FEDRC management authorities, this person shall have the responsibility to implement improvements to the LDAR program.</p> | Frontier recently voluntarily disclosed audit findings indicating the written LDAR plan had not been kept up-to-date. The plan was updated in December 2012 to address this. |
| 145 | FRI and FEDRC shall submit a copy of each Covered Refinery's initial written LDAR Program to EPA and to the Applicable Intervenor with the first Semi-Annual Progress Report required by Paragraph 170(a). EPA shall review and may comment on the written program after an opportunity for consultation with the Applicable Intervenor. FRI and/or FEDRC, as appropriate, shall address EPA's comments (if any). A description of program changes shall be maintained on-site during the term of this Consent Decree but need not be submitted to the agencies. | Previously submitted. |
| 146 | Training. If not already in place, FRI and FEDRC shall commence implementation of the following training programs at each Covered Refinery: | Training is conducted as required and records are maintained. |
| 146a | As of the Date of Entry of this Consent Decree, for any employee newly-assigned to LDAR responsibilities, FRI and FEDRC shall require that each such employee satisfactorily complete LDAR training prior to beginning any LDAR work; | Training is conducted as required and records are maintained. |
| 146b | By no later than the Date of Entry, for all FRI and FEDRC employees assigned specific LDAR responsibilities as a primary job function, such as monitoring technicians, database users, quality assurance/quality control ("QA/QC") personnel and the LDAR Coordinator, FRI and FEDRC shall provide and require completion of annual LDAR refresher training and initial training before the employee begins LDAR responsibilities; | Training is conducted as required and records are maintained. |
| 146c | By no later than the Date of Entry, for all other FRI and FEDRC employee operations and maintenance personnel, FRI and FEDRC shall provide and require completion of an initial training program that includes instruction on aspects of LDAR that are relevant to the person's duties. Refresher training for these personnel shall be performed every three years; | Training is conducted as required and records are maintained. |

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| 146d | If contract employees are performing LDAR work, FRI and/or FEDRC, as appropriate, shall maintain all training records, as required under this Paragraph, for the contract employees; and e. Training records shall be kept for a period of five (5) years. | Training is conducted as required and records are maintained. |
| 147 | LDAR Audits. At their respective Covered Refineries, FRI and FEDRC shall implement the refinery-wide audits set forth in Paragraphs 147 - 150 to ensure each Covered Refinery's compliance with all applicable LDAR requirements. The LDAR audits shall include but not be limited to, comparative monitoring, observation of the LDAR technicians' calibration and monitoring techniques, records review to ensure monitoring and repairs were completed in the required periods, a field audit to ensure affected equipment has been identified and included in the facility LDAR program, and a review to ensure records and reports have been maintained and submitted as required. During the LDAR audits, leak rates shall be calculated for each process unit where comparative monitoring was performed. Each LDAR audit shall be conducted by personnel with expertise in LDAR regulations. | LDAR audit program was implemented. See below for details. |
| 148 | 148. Initial Compliance Audit. By no later than the Date of Entry, at their respective Covered Refineries, FRI and FEDRC shall engage a third-party contractor to undertake a refinery-wide audit of its compliance with the LDAR regulations at each of the Covered Refineries, including, at a minimum, each of the audit requirements set forth in Paragraph 147. No later than sixty (60) days after completion of each audit, FRI and FEDRC shall report to EPA and the Applicable Intervenor any areas of non-compliance identified as a result of its refinery-wide audits and submit in writing proposed compliance schedule for correcting any non-compliance. If the proposed compliance schedule(s) extends for more than sixty (60) days beyond the audit completion date, FRI and/or FEDRC, as applicable, must seek approval of the compliance schedule from EPA. At their respective Covered Refineries, FRI and FEDRC shall implement the compliance schedule as proposed until the schedule is approved or disapproved by EPA. Unless the request for a schedule extension is approved by EPA, within ninety (90) days of completing each audit and by no later than two hundred and forty (240) days after the Date of Entry, FRI and FEDRC shall certify to EPA that each Covered Refinery: a. is in compliance; b. has completed related corrective action (if necessary) and/or is on a compliance schedule; and c. specifically certify that all affected equipment has been identified and included in the facility LDAR program to the extent of the program as of the Date of Entry. | Previously completed. |
| 149 | Third-Party Audits. FRI and FEDRC shall retain one or more independent contractor(s) to perform a third-party audit of each of the Covered Refineries' LDAR programs, including compliance with LDAR regulations and the LDAR requirements under Section VI.M. of this Consent Decree, at least once every four (4) years. | Third-Party audits are conducted as required. |

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| 150 | Internal Audits. FRI and FEDRC shall conduct internal audits of each of the Covered Refineries' LDAR programs by sending personnel from one Covered Refinery to audit the other Covered Refinery's LDAR program. The audits, among other things, shall include a review of compliance with LDAR regulations and the LDAR requirements under Section VI.M. of this Consent Decree. FRI and FEDRC shall complete the first internal LDAR audit at each Covered Refinery by no later than two years after the initial third-party audit for the Covered Refinery was conducted according to Paragraph 148. Internal audits of each of the Covered Refineries shall be conducted at least once every four years thereafter. FRI and/or FEDRC may elect to retain third-parties to undertake these internal audits, provided that an audit of each of the Covered Refineries occurs every two (2) years. | Audits are conducted by third-parties every 2 years. The last audit was completed in August 2013. |
| 151 | Audit Every Two Years. To ensure that an audit at each of the Covered Refineries occurs every two years, third-party and internal audits shall be separated by two years. | Internal audits are conducted by third-parties every 2 years. The last audit was completed in August 2013. |
| 153 | Internal Leak Definition for Valves and Pumps. Except as provided in Subparagraph 153.c., on and after the Date of Entry, for the Covered Refineries FRI and FEDRC shall utilize the following internal leak definitions for valves and pumps in light liquid and/or gas/vapor service, unless other permit(s), regulations, or laws require the use of lower leak definitions: | Implemented as required. |
| 153a | Leak Definition for Valves. 500 ppm VOCs for all the Covered Refinery's valves, excluding pressure relief devices; and | Implemented as required. |
| 153b | Leak Definition for Pumps. 2,000 ppm VOCs for all of the Covered Refinery's pumps. | Implemented as required. |
| 154 | Reporting of Valves and Pumps Based on the Internal Leak Definitions. For regulatory reporting purposes, FRI and FEDRC may continue to report leak rates in valves and pumps against the applicable regulatory leak definition or use the lower, internal leak definitions specified in Paragraph 153. FRI and FEDRC shall identify in the report which definition is being used. | Frontier includes in applicable regulatory reports both the applicable regulatory leak definition and the internal leak definition. |
| 155 | Recording, Tracking, Repairing and Re-Monitoring Leaks Based on the Internal Leak Definitions. By no later than the date FRI and FEDRC implement the lower leak definitions under Paragraph 153, each shall record, track, repair and re-monitor all leaks in excess of the internal leak definitions in Paragraph 153. FRI and FEDRC shall have five (5) days to make an initial repair attempt and re-monitor the component under Paragraph 157.a and thirty (30) days either to make repairs and re-monitor leaks that are greater than the internal leak definitions but less than the applicable regulatory leak definitions or to place the component on the delay of repair list according to Paragraph 167. All records of repairs, repair attempts, and re-monitoring shall be maintained for the life of this Consent Decree. | Implemented as required. |

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| 156 | Election of Compliance for Initial Attempt at Repair or Use of IR Camera. Within thirty (30) days of the Date of Entry of this Consent Decree, for each Covered Refinery, FRI and FEDRC shall notify EPA and the Applicable Intervenor as to which one of the following options it shall comply with: a. FRI and/or FEDRC shall comply with Paragraph 157.a. of this Consent Decree; or b. FRI and/or FEDRC shall comply with Paragraph 157.b. of this Consent Decree. If either FRI or FEDRC elects the option in Paragraph 156.a., above, at any time after the Date of Entry of this Consent Decree, either may, at its option, conduct a study of the efficacy of reducing VOC emissions from utilizing the 200 ppm of VOCs leak level for the initial attempt at repair. FRI or FEDRC may submit the results of such study to EPA with a request for EPA approval to change its election to the option in Paragraph 156.b. above. | Frontier elected to comply with 156b. The program to conduct initial attempt at repair has been implemented as required. |
| 157 | Additional VOC Monitoring. Upon the election of the compliance option under Paragraph 156, FRI and FEDRC shall comply with at least one of the following additional VOC monitoring requirements: | Frontier elected to comply with 156b. The program to conduct initial attempt at repair has been implemented as required. |
| 157a | Initial Attempt at Repair. No later than sixty (60) days after the Date of Entry, FRI and FEDRC shall promptly make an "initial attempt" at repair on all valves that have a reading greater than 200 ppm of VOCs, excluding control valves. FRI and FEDRC, shall re-monitor the leaking valve within five (5) days of identification. i. If the re-monitored leak rate is below the applicable leak definition, Paragraph 153, no further action shall be necessary. ii. If the re-monitored leak reading is greater than the applicable leak definition, Paragraph 153, repair the leaking valve according to the requirements under Paragraph 155. All records of repairs, repair attempts, and re-monitoring shall be maintained for the life of this Consent Decree. iii. If FRI or FEDRC can demonstrate with sufficient monitoring and repair data that this "initial attempt" at repair requirement at 200 ppm does not reduce emissions, after two (2) years of implementing the "initial attempt" requirement, either may request that the EPA reconsider or amend this requirement; | Frontier elected to comply with 156b. The program to conduct initial attempt at repair has been implemented as required. |
| 158 | LDAR Monitoring Frequency: Pumps. Unless more frequent monitoring is required by a federal or state regulation when the lower internal leak definition for pumps becomes applicable pursuant to the provisions of Paragraph 153, FRI and FEDRC shall begin monitoring pumps in light liquid service, other than dual-mechanical seal pumps or pumps vented to a control device, at the lower leak definition on a monthly basis. | Pumps are monitored as required. |
| 159 | LDAR Monitoring Frequency: Valves. Unless more frequent monitoring is required by a federal or state regulation when the lower internal leak definition for valves becomes applicable pursuant to the provisions of Paragraph 153, FRI and FEDRC shall monitor valves, other than difficult-to-monitor or unsafe-to-monitor valves, on a quarterly basis. | Valves are monitored as required. |
| 160 | Electronic Storing and Reporting of LDAR Data. FRI and FEDRC have and shall continue to maintain an electronic database for record keeping of all LDAR monitoring and repair data from each of the Covered Refineries. | Data is managed electronically as required. |

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| 161 | Electronic Data Collection During LDAR Monitoring and Transfer. Beginning no later than the Date of Entry, FRI and FEDRC shall use data loggers and/or electronic data collection devices during LDAR monitoring. FRI and FEDRC, or their respective designated contractor(s), shall use their best efforts to transfer, on a daily basis, electronic data from electronic data logging devices to the electronic database required by Paragraph 160. For all monitoring events in which an electronic data collection device is used, the collected monitoring data shall include a time and date stamp, and instrument and operator identification. FRI and FEDRC may use paper logs where necessary or more feasible (e.g., small rounds, remonitoring, or when data loggers are not available or broken), and shall record, at a minimum, the identification of the technician undertaking the monitoring, the date, the daily start and end time for monitoring, and the identification of the monitoring equipment. FRI and FEDRC shall transfer any manually recorded monitoring data to the electronic database required by Paragraph 160 within seven (7) days of monitoring. FRI and FEDRC shall maintain the LDAR information required by this Paragraph for the life of this Consent Decree. | Data is managed electronically as required. |
| 162 | QA/QC of LDAR Data. If not already in place, beginning no later than the Date of Entry, FRI and FEDRC shall develop and implement a procedure to ensure a QA/QC review of all data generated by LDAR monitoring technicians. At their respective Covered Refineries, FRI and FEDRC shall ensure that monitoring collected by monitoring technicians is reviewed for QA/QC by the technician daily. At least once per calendar quarter, FRI and FEDRC shall QA/QC the monitoring data collected during the quarter which shall include, but not be limited to, an evaluation of the number of components monitored per technician, time between monitoring events, and abnormal data patterns. Results from LDAR monitoring indicating any leaks requiring a first-attempt repair shall be reported to unit supervisors daily. | QA/QC program is in place. |
| 163 | LDAR Personnel. By no later than one-hundred and eighty (180) days after the Date of Entry, at their respective Covered Refineries, FRI and FEDRC shall establish a program that shall hold LDAR personnel accountable for LDAR performance. FRI and FEDRC shall maintain a position responsible for LDAR management, with authority to implement improvements, ("LDAR Coordinator") at each Covered Refinery . | Contained in the LDAR sitewide monitoring plan. |
| 164 | Adding New Valves and Pumps. By no later than one-hundred and eighty (180) days after the Date of Entry, FRI and FEDRC shall establish a tracking program for maintenance records (e.g., a Management of Change program) to ensure that new valves and pumps added to each of the Covered Refineries during maintenance and construction are integrated into the LDAR program. | The MOC program at the facility is utilized to track new valves and pumps. Frontier recently voluntarily disclosed audit findings indicating some valves and pumps were not caught by this program. The program has been updated. |
| 165 | Calibration. FRI and FEDRC shall conduct all calibrations of LDAR monitoring equipment using methane as the calibration gas, in accordance with 40 C.F.R. Part 60, Appendix A, EPA Reference Test Method 21, and shall maintain records of the calibrations for the life of this Consent Decree. | Calibrations are conducted as required. |

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| 166 | Calibration Drift Assessment. Beginning no later than the Date of Entry, FRI and FEDRC shall, at each Covered Refinery, at a minimum conduct calibration drift assessments of LDAR monitoring equipment at the end of each monitoring shift. FRI and FEDRC shall conduct the calibration drift assessment using, at a minimum, a 500 ppm calibration gas. If any calibration drift assessment after the initial calibration shows a negative drift of more than 10% from the previous calibration, FRI and FEDRC shall re-monitor all valves that were monitored since the last calibration that had a reading greater than 100 ppm and shall re-monitor all pumps that were monitored since the last calibration that had a reading greater than 500 ppm. | Calibration drift assessments are conducted as required. Frontier recently voluntarily disclosed audit findings indicating that these requirements may have been missed on a few monitoring events. Details are in the disclosure. |
| 167 | Delay of Repair. Beginning no later than the Date of Entry, at their respective Covered Refinery, FRI and FEDRC shall implement the following requirements: | Program previously implemented. |
| 167a | For all equipment: i. Require sign-off by the unit supervisor that the piece of equipment is technically infeasible to repair without a process unit shutdown, before the component is eligible for inclusion on the "delay of repair" list; and ii. Include equipment that is placed on the "delay of repair" list in regular LDAR monitoring. | Program previously implemented. |
| 167b | For valves: For valves (other than control valves) leaking at a rate of 10,000 ppm or greater that cannot otherwise be repaired, FRI and FEDRC shall use "drill and tap" or similarly effective repair methods to repair such leaking valves unless they can document that there is a safety, mechanical, or major environmental concern posed by repairing the leak in this manner. FRI and FEDRC shall make two repair attempts (if necessary) using "drill and tap" or similarly effective repair method within thirty (30) days of identification of the leak. | Program previously implemented. |
| 168 | New Method of Repair for Leaking Valves. If a new valve repair method not currently in use by the refining Industry is planned to be used by FRI or FEDRC, they shall advise EPA pursuant to Section XIX (General Provisions), Paragraph 356 (Notice) prior to implementing such a method or, if prior notice is not practicable, as soon as practicable after implementation. | No new methods of repair are being utilized or proposed. |
| 169 | Chronic Leaker Program. FRI and FEDRC shall replace, re-pack, or perform similarly effective repairs on all chronically leaking non-control valves at the next process unit turnaround. A chronic leaker shall be defined as any component that leaks above 10,000 ppm twice in any consecutive four (4) quarters. If a component has not leaked above 10,000 ppm for a period of twelve (12) consecutive quarters or more prior to a turnaround, it is exempt from the requirements in this Paragraph. | Program previously implemented. |

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| 171 | 171. Reports due under 40 C.F.R. § 63.654. In each report due under 40 C.F.R. § 63.654, FRI and FEDRC shall include: a. Training. Information identifying the measures implemented to comply with the provisions of Paragraphs 146 and 163; and b. The following information on LDAR monitoring and repairs: i. the number of valves and pumps present in each process unit during the quarter; ii. the number of valves and pumps monitored in each process unit; iii. an explanation for missed monitoring if the number of valves and pumps present exceeds the number of valves and pumps monitored during the quarter; iv. the number of valves and pumps found leaking via Method 21; v. the number of leaks identified through optical imaging (if performing); vi. the number of "difficult to monitor" pieces of equipment monitored; vii. a list of all equipment currently on the "delay of repair" list and the date each component was placed on the list; viii. the number of repair attempts not completed promptly according to Paragraph 155 or completed within five (5) days pursuant to Paragraph 157; ix. the number of repairs not completed within thirty (30) days or placed on the delay of repair list according to Paragraph 155 and/or Paragraph 167; x. the number of chronic leakers that do not get repaired according to the requirements of Paragraph 169; and xi. the number of repairs to leaks identified through optical imaging which are not performed within five (5), or fifteen (15), or forty-five (45) days, respectively, according to Paragraphs 157.b. | Information included in reports. See those reports for details. |
| N | CERCLA/EPCRA Reviews | |
| 172 | CERCLA/EPCRA Compliance Review. FRI and FEDRC shall each conduct a CERCLA/EPCRA Compliance Review at their respective Covered Refinery of the five (5) year period prior to the Date of Entry of this Consent Decree to identify any releases that may have been reportable under Section 103(a) of CERCLA, 42 U.S.C. § 9603(a), and Section 304 of EPCRA, 42 U.S.C. § 11004, or similar or corresponding state reporting regulations. Upon completion of this review, FRI and FEDRC shall resolve their respective liability for potential violations of Section 103(a) of CERCLA and Section 304 of EPCRA, or similar or corresponding state reporting regulations, with respect to the events identified in its Compliance Review by completing the following activities no later than one hundred and twenty (120) days after the Date of Entry: | Previously completed. |
| 172 | For all releases for which FRI and FEDRC seek a resolution of liability, submit a CERCLA/EPCRA Compliance Review Report to EPA and the Applicable Intervenor that identifies potential violations of Section 103(a) of CERCLA and Section 304 of EPCRA, or similar or corresponding state reporting regulations; | Previously completed. |
| 172b | Based on the Compliance Review Report, correct and/or update release reporting procedures and identify specific steps FRI and FEDRC shall take to ensure compliance in the future. FRI and FEDRC shall submit a copy of the corrected reporting procedures to EPA and the Applicable Intervenor; and | Previously completed. |
| 172c | Conduct training for the environmental compliance staffs at FRI and FEDRC to instruct them on the reporting requirements of Section 103(a) of CERCLA, 42 U.S.C. § 9603(a), and Section 304 of EPCRA, 42 U.S.C. § 11004, or similar or corresponding state reporting regulations, and to acquaint the compliance staffs with the procedures adopted by FRI and FEDRC to meet those requirements. | Most recent training completed August 2013. |

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| VII | ENVIRONMENTALLY BENEFICIAL PROJECTS | |
| 188 | FRI SEP. In accordance with the requirements set forth in Paragraphs 200 - 206 of this Consent Decree, FRI shall at its Cheyenne, Wyoming Refinery spend no less than \$405,000 to implement and complete the Supplemental Environmental Project ("SEP") described in Paragraphs 189 and 190, infra. | SEP project to install two geodesic domes completed in Feb 2010. |
| 189 | FRI shall install a geodesic dome fixed roof on two 70 foot diameter finished gasoline storage tank which are designated Tank 2-70 and 2-71. Installing the geodesic dome roofs will convert the current external floating roof tank to an internal floating roof tank which FRI represents will reduce the amount of VOC and other hazardous air pollutants from the converted tank by approximately 49,490 pounds per year ("lb/yr"). | SEP project to install two geodesic domes completed in Feb 2010. |
| 190 | FRI shall submit a detailed description of the SEP, a work plan, and SEP implementation schedule to EPA and WDEQ for review and approval within one hundred and eighty (180) days of the Date of Entry of this Consent Decree. Installing the fixed roofs requires that the tanks be taken out of service for approximately four to six weeks. This has the potential to impact gasoline supplies in the area. FRI shall develop a work plan to minimize any such impacts. Within thirty (30) days of final approval by EPA, FRI shall implement the SEP in accordance with the approved work plan and schedule. FRI shall complete implementation of the project in accordance with the election made under Paragraph 220 unless an alternative schedule is approved in writing by EPA and WDEQ. | SEP project to install two geodesic domes completed in Feb 2010. |
| 200 | SEP Performance. SEPs described in this Section VII. shall conform to the requirements of EPA's "EPA Supplemental Projects Policy" (effective May 1, 1998). SEP work plans submitted under this Section VII are incorporated by reference herein and are enforceable as part of this Consent Decree. | SEP project to install two geodesic domes completed in Feb 2010. |
| 201 | If at any time prior to the completion of the projects identified in Paragraphs 188 through 199, either FEDRC or FRI is required to perform any of those projects pursuant to a federal, state, or local statute, regulation, or permit, then FEDRC and/or FRI, as applicable, shall not receive SEP credit for the amounts expended on that project. Within one hundred and twenty (120) days of any event that invalidates a specific SEP: a. For FEDRC, FEDRC shall propose for approval by EPA and KDHE an additional SEP of equal or greater value to be performed at FEDRC or in the same community as the invalidated SEP; and b. For FRI, FRI shall propose for approval by EPA and WDEQ an additional SEP of equal or greater value to be performed at FRI or in the same community as the invalidated SEP. | SEP project to install two geodesic domes completed in Feb 2010. |

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| 202 | FRI and FEDRC are responsible for the satisfactory completion of the SEPs identified in Paragraphs 188 through 199 of this Consent Decree. Upon completion of each SEP, FEDRC and/or FRI, as applicable, shall submit to EPA and the Applicable Intervenor a SEP construction completion and cost report (documenting SEP expenditures and including copies of invoices, receipts, purchase orders, etc.) accompanied by a certification by a responsible corporate official in the form required pursuant to Paragraph 219 of this Consent Decree. a. If FRI and/or FEDRC do not expend the entire projected cost of any SEP, then FRI and/or FEDRC, as applicable, shall pay a stipulated penalty equal to the difference between the amount expended as demonstrated in the certified cost report and the projected cost with one half of that amount payable to EPA and the remaining half payable to the Applicable Intervenor. The stipulated penalty shall be paid as provided in Section XIII (Stipulated Penalties) of this Consent Decree. b. If FRI and/or FEDRC withdraw a SEP, or otherwise do not implement a SEP required under this Consent Decree, then FRI and/or FEDRC, as applicable, shall either: (i.) Notwithstanding the election in Paragraph 220, pay a stipulated penalty equal to one hundred and ten percent (110%) of the full cost of the withdrawn SEP. This stipulated penalty shall apply in lieu of stipulated penalties under Paragraph 298 of this Consent Decree. One half of the foregoing amount shall be payable to EPA and the remaining half payable to the Applicable Intervenor; or (ii.) Propose for approval by EPA and the Applicable Intervenor a substitute SEP or SEPs of equal or greater value to be performed at the Covered Refinery or in the same community as the withdrawn SEP. | SEP project to install two geodesic domes completed in Feb 2010. |
| 203 | Should FEDRC or FRI, as applicable, fail to implement any SEP in accordance with the schedule approved by EPA and the Applicable Intervenor, FEDRC or FRI, as applicable, shall be liable for the payment of stipulated penalties in accordance with the provisions of Section XIII. (Stipulated Penalties) of this Consent Decree as specified in Paragraph 298 of this Consent Decree. | SEP project to install two geodesic domes completed in Feb 2010. |
| 204 | By signing this Consent Decree, FRI and FEDRC each certifies for its respective refinery that it is not required, and has no liability under any federal, state or local law or regulation or pursuant to any agreement or order of any court, to perform or develop any of the SEP projects identified in Paragraphs 188 through 199 of this Consent Decree. Further, FRI and FEDRC each certifies for its respective refinery that it has not applied for or received, and will not in the future apply for or receive credit as a SEP or other penalty offset in any other enforcement action for any project set forth in Paragraphs 188 through 199 of this Consent Decree and, except as otherwise specifically provided in this Consent Decree, credit for any emissions reduction resulting from any SEP project set forth in Paragraphs 188 through 199 of this Consent Decree in any federal, state or local emissions netting, trading, or early reduction program, or similar emissions compliance program. For federal income tax purposes, FRI and FEDRC each agree for its respective refinery that it will neither capitalize into inventory or basis nor deduct any costs or expenditures incurred in performing SEPs. | SEP project to install two geodesic domes completed in Feb 2010. |
| 206 | FRI and FEDRC each agree that in any public statements regarding these SEPs, FRI and FEDRC shall clearly indicate that these projects are being undertaken as part of the settlement of an enforcement action for alleged violations of the CAA and corollary state statutes. | Frontier does not issue public statements regarding the SEPs. |

| Paragraph | Attachment H - Miscellaneous | Comments |
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| VII | INCORPORATION OF CONSENT DECREE REQUIREMENTS INTO FEDERALLY ENFORCEABLE PERMITS. | |
| 207 | Obtaining Permit Limits for Consent Decree Emission Limits That Are Effective Upon Entry. By no later than one hundred and twenty (120) days after the Date of Entry of this Consent Decree, FRI and FEDRC shall submit applications to the Applicable Intervenor(s) to incorporate the emission limits and standards required by this Consent Decree that are effective as of the Date of Entry into federally enforceable minor or major new source review permits or other permits (other than CAA Title V permits). Following submission of the permit applications, FRI and FEDRC shall cooperate with the Applicable Intervenor by promptly submitting to the Applicable Intervenor all information that the Applicable Intervenor seeks following their receipt of the permit applications. Upon issuance of such permits or in conjunction with such permitting, FRI and FEDRC shall file any applications necessary to incorporate the requirements of those permits into the CAA Title V permit for the relevant Covered Refinery. | Frontier has applied for the limits and is working with WDEQ to incorporate them as needed. |
| 208 | Obtaining Permit Limits for Consent Decree Emission Limits That Become Effective After Date of Entry. As soon as practicable, but in no event later than ninety (90) days after the effective date or establishment of any emission limits and/or standards under Section VI. (Affirmative Relief) of this Consent Decree, FRI and FEDRC, as appropriate, shall submit applications to the Applicable Intervenor to incorporate those emission limits and/or standards, identified in Appendix J, into federally enforceable minor or major new source review permits or other permits, other than CAA Title V permits, which are federally enforceable. Following submission of the permit application(s), FRI and FEDRC, as appropriate, shall cooperate with the Applicable Intervenor by promptly submitting to the Applicable Intervenor all information that the Applicable Intervenor seeks following its receipt of the permit application. Upon issuance of such permit or in conjunction with such permitting, FRI and FEDRC, as applicable, shall file any applications necessary to incorporate the requirements of that permit into the Title V permit of the appropriate Covered Refinery. | Frontier has applied for the limits and is working with WDEQ to incorporate them as needed. |
| 209 | Mechanism For Title V Incorporation. The Parties agree that the incorporation of any emission limits or other standards into the CAA Title V permits for the Covered Refineries where required by this Consent Decree shall be in accordance with the applicable state or local CAA Title V rules. | Frontier has applied for the limits and is working with WDEQ to incorporate them as needed. |
| 210 | Construction Permits. FRI and FEDRC each agree to use best efforts to obtain all required, federally enforceable permits for the construction of the pollution control technology and/or the installation of equipment necessary to implement the affirmative relief and environmental projects set forth in Section VI. (Affirmative Relief) and Section VII (Environmentally Beneficial Projects) of this Consent Decree. To the extent that FRI and/or FEDRC must submit permit applications for this construction or installation to the Applicable Intervenor(s), they each shall cooperate with the Applicable Intervenor by promptly submitting to the Applicable Intervenor all information that the Applicable Intervenor seeks following its receipt of the permit application. | Frontier has applied for the limits and is working with WDEQ to incorporate them as needed. |

Attachment H - EMISSIONS SUMMARY

P217F - Summary of All Other Emission Sources

| | PM | SO2 | NOx | CO | |
|-------------|-----|-----|-----|----|---|
| Grand Total | 292 | 153 | 22 | 16 | CEMs, Emission Factors, Stack Tests, Various |